GE Healthcare

SEER ™ 1000

ECG recorder and software-app usage instructions

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SEER ™ 1000 ECG recorder and software-Portuguese app

About this documentation

The information in this manual are for SEER ™ 1000 ECG recorder and software-app version 1.0. They do not apply to prior versions. Due to progressive product innovation, the specifications listed in this manual are subject to change without notice.

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This product meets the regulatory requirements for medical devices of the following:

CE 0197

Revision History

The document number of the piece and the appointment of the review appear at the bottom of each page. The review refers to the level of document review. The historical revision of this document is summarized in the following table.

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THE	November 8, 2013	first publication
B	April 8, 2014	modified: "Basic information about the wireless Bluetooth connection"
W	May 26, 2015	EAC
D	November 3, 2015	" Connect the ECG cable to the recorder and the electrodes **"Page 46"** Data protection on the recorder **"57 page"** Using the Apple iOS App **", Page 61**

Please contact the site is representative of GE Healthcare regarding other applicable documents.

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Introduction

This document describes the SEER 1000 ECG recorders and softwareapps SEER 1000, also known as "systems", "device", "products" or "equipment". This manual is intended for users of these devices.

There are three SEER 1000 ECG recorders, which differ in maximum recording time and the color of the face;

- 24 hours (blue)
- 48 hours (purple)
- 7 days * (green)

* Long-term MARS ECG analysis system supports the ECG recording during a period of up to three days.

All three SEER 1000 ECG recorders are for use both in adults, but also suitable for pediatric patients (including patients weighing less than 10 kg). Inquire please about any restrictions on the long-term ECG analysis seusoftware operating instructions.

They can be purchased two software applications, one for the Apple iOS App and the other as a software application for the Microsoft Windows operating system. Both applications are designed to transmit patient data to a recorder for recording the preparation, visually examine the ECG curves, changing the recorder settings, and start recording. The use of these apps is optional.

This chapter contains general information that is necessary for proper use of the goods and this instruction manual. Familiarize yourself with this information before using the system.

Target group

The devices are intended for use by trained users in hospitals and medical centers, under the direct supervision of a qualified physician.

Indication

The SEER 1000 is a recorder to ECG long-term, indicated for patients who could benefit from a continuous long-term ECG recording. These are for example patients who complain of palpitations, chest pain or shortness of breath, or patients who should be monitored for their ability current heart can be evaluated.

Goal

The ECG SEER 1000 long-term recorder is designed for continuous recording of ECG data. The recorder does not make any cardiac analysis and is intended to be used in conjunction with a long-term ECG analysis software. The recorded data are downloaded on a PC, to be then be analyzed and evaluated by a doctor or experienced specialist.

Contraindications

Contraindications to the use of the equipment are not known.

subject to prescription device

CAUTION

Note that in the US a national law only allows the appliance to be used by a physician or under his order.

Regulations and safety information

This section contains information on the safe use of this system and compliance with legal requirements. Familiarize yourself with this information, and read and understand all instructions before attempting to use this system. The system software is seen as a medical software. As such, it was designed and built in accordance with the relevant regulations and health controls.

NOTE

Failure to follow the safety instructions is regarded as improper use of this system and can cause injury, loss of data or void the warranty.

The meaning of the signal words

A risk is defined as a source of potential injury to a person or damage to property.

The terms "Warning", "Caution" or "Warning" are used in this manual to indicate the risk and severity of a threat. Familiarize yourself with the following settings:

Definition of signal words

Signal word	Definition
DANGER	It indicates an immediate risk that, if not avoided, could result in death or serious injury. (Not used in this instruction manual.)
NOTICE	indicates a potential hazard or unsafe practices which, if not avoided, could result in death or serious injury.
CAUTION	indicates a potential hazard or unsafe practices which, if not avoided, could result in minor or moderate injury.
ATTENTION	indicates a potential hazard or unsafe practices which, if not avoided, could result in damage to the product or other property, and loss of data.

Safety instructions

The following safety instructions apply to the entire system. specific safety instructions can occur in other parts of this manual.

WARNINGS

NOTICE

NO MONITORING DEVICE - The SEER 1000 is not a monitoring device and is not suitable for monitoring the patient's clinical status.

Do not use the SEER 1000 as a monitoring device.

NOTICE

RECORDINGS OF CONFUSION - risk to health or life of a patient can arise when a patient is assigned to the ECG recording of another, and this leads to a diagnosis incorrectly assigned.

Be especially careful to always select the correct recording and the right patient. Between, in case of digital management of patients where the patient ID or enter the patient ID in the door-data to ensure that a recording is not assigned to the wrong patient.

NOTICE

ELECTROSURGERY - There is a risk of burns and damage to the patient.

When an electrosurgical instrument is used, you must disconnect the cable ECG recorder.

NOTICE

EXPLOSION HAZARD - electric sparks in the presence of certain gases can cause explosions.

Do not use the recorder in a oxygen-rich environment, or the presence of other flammable or explosive gases.

Make sure a patient, possibly for reasons of professional, could remain in such environments.

NOTICE

CABLE - Cables pose a strangulation risk

To avoid a potential bottleneck situation route all cables away from the patient's neck. Use in pediatric patients short versions of the cable.

NOTICE

Conductive Materials - can result in electric shock or malfunction of the device, if the electrodes come in contact with conductive materials.

Make sure that the conductive parts of electrodes and associated parts do not come into contact with any other conductive parts or grounding. Make sure that there is no contact with other conductive parts, if electrodes become loose during recording.

NOTICE

DANGER GENERAL FOR PATIENT - The information in this manual, do not replace in any way, the information to good medical practice of patient care.

Proceed, in all circumstances, in accordance with good medical practice.

NOTICE

DANGER OF CONTAMINATION OR INFECTION - The recorder and its accessories may be contaminated with bacteria or viruses after use.

When the recorder is contaminated in some way, observe the standard procedures for handling contaminated objects and the following precautions:

O Wear gloves when touching the objects.

O Isolate the packing material and appropriate labeling.

O Send stained material only after consultation with the recipient and appropriately labeled.

O Clean the burner and the accessories after each use.
Information, are in the " Maintenance " on the page 111.

NOTICE

CHOKING HAZARD - Packaging materials are a choking hazard.

Do not leave packaging material within reach of children.

INDICATIONS OF CAUTION

CAUTION

RISK OF INFECTION - The re-use of consumables, which come into contact with the patient present a risk of infecting other patients.

Do not use consumables (eg, electrodes) after they have already been used on a patient.

CAUTION

INFECTION RISK - Our service team is exposed to a risk of infection if parts are shipped or products that have not been disinfected.

Disinfect the recorder and ECG cable for hygienic reasons in particular to protect our personal assistance service, before sending them back for inspection or maintenance.

INDICATIONS OF ATTENTION

ATTENTION

Damage to the cable - the cable can be damaged if it is bent strongly curved or curled.

When placing and connecting the ECG cable, ensure that it can not be damaged. Never wrap the cord around the burner. The correct handling is explained in section " Connect the ECG cable to the recorder and the electrodes ", Page 46.

ATTENTION

DAMAGE TO UNIT due to battery FLUID LEAK - The batteries may leak if a device is not used for a long time.

Remove the phone's battery if it is not used for more than a week.

ATTENTION

POOR QUALITY OF ECG RECORDINGS - may be of insufficient quality of ECG recordings, if the patient is not properly prepared.

Properly prepare the patient for recording, as explained in section " Preparing for recording "On page 39.

ATTENTION

POOR QUALITY OF ECG RECORDINGS - Damage recorders and accessories can lead to insufficient quality of ECG recordings.

Control visually for damage to the recorder and ECG-ECG cable before applying the recorder and the electrodes on a patient.

ATTENTION

A malfunction or damage in the unit - Changes in temperature or humidity may cause condensation in the burner.

Wait at least two hours beyond the visible drying outside the recorder, to use it again.

ATTENTION

MACHINE DAMAGE - On the recorder only can open the battery compartment.

Do not apply in any way, force the recorder.

ATTENTION

ONLY WITH SAFETY ACCESSORIES APPROVED - A safe and reliable operation of the machine is possible only when using the supplied or approved accessories.

Please follow the relevant instructions in this manual and the "Manual of spare parts and accessories", as well as the instructions supplied with the accessories.

ATTENTION

SAFETY AND RELIABILITY ONLY WHEN MAINTENANCE IS CARRIED OUT CORRECTLY - Proper maintenance is essential to ensure the long-term safety and reliability recorder.

Note the information in the chapter " Maintenance "On page 111.

ATTENTION

UNIT DAMAGE AND ACCESSORIES - Unauthorized personnel may not have the training necessary to repair the device. If repairs are carried out by unauthorized persons, this can result in damage to the appliance and accessories.

Send the device to check a failure or even suspect that there is to have it checked at GE Healthcare or an authorized representative of GE Healthcare. Attach an accurate description of the observed disturbance.

ATTENTION

DIFFICULTIES IN SEARCH PROBLEMS - The recorder and ECG cables are needed to find the faults and repair them.

For service or repair to the unit, always send also the ECG cable used. (Not wrap the cord around ECG recorder, as this may damage the cable).

Use a tape recorder to always the same ECG cable. Note that when multiple recorders are available in a facility that a recorder is always in conjunction with a specific ECG cable. Thus errors can be located and repaired faster.

ATTENTION

ENVIRONMENTAL POLLUTION - Electronic devices and accessories may contain metal and plastic parts, which need to be eliminated at the end of its useful life, in accordance with applicable waste regulations to prevent environmental pollution.

Dispose of the device and accessories at the end of life, the way required by local and national regulations.

If you have questions about the disposal of this product, entr contact GE Healthcare or an authorized GE Healthcare representative.

ATTENTION

RECORDINGS OF LOSS OR INSUFFICIENT ECG SIGNAL QUALITY - It may be that the recorder be used with unsatisfactory results if the patient does not have all the necessary information.

It is the responsibility of the physician, give the patient the necessary information for an evaluable ECG recording. In the section " Inform the patient "On page 40 are more information.

ATTENTION

INTERFERENCE - electrical emissions of an electric blanket can reduce the signal quality.

Do not use the recorder with an electric blanket.

Medical Device Classification

The device is classified as follows, according to IEC 60601-1:

Medical Device Classification

Category	ranking
protection against electric shock Degree	Type CF, application component not protected defibrillator
Protection against ingress of dust and water	The recorder's protection class is IP43, with: 4 = Protection against objects> 1 mm 3 = Protection against splashing water
The level of security when used in the presence of flammable mixtures and anesthetic agents and oxygen or air or nitrous oxide	The device is not suitable for use in the presence of a flammable mixture of anesthetic and air or oxygen or laughing gas.
sterilization and disinfection process suggested by the manufacturer	Not applicable
operational	continuous operation

Certification

Medical equipment

Certification with respect to electrical shock, fire and mechanical hazards only in accordance with IEC 60601-1 CAN / USA C22.2 NO. 601.1, IEC 60601-1-2 and IEC 60601-2-47.

Accuracy of the input signal

The amplitude frequency response corresponds to the following requirements of IEC 60601-2-47 Section 51.5.9:

- In the burner, the effect of a rectangular pulse 5mV / 100 ms after the pulse does not lead to a displacement of position zero amplitude greater than 0.1 mV in relation to the zero line before drive. The reduction of the pulse is less than 0.3 mV / s. The excess of the first pulse flank is less than 10%.

- Playback of all pulses of a triangular pulse sequence of 1.5 mV / 40 ms, which simulates a next series of R-waves is within 80% to 110% reproduction of a sequence of triangular pulse 1.5 mV / 200 ms.

Warning EMS / CEM / AF

The system was designed and tested to meet the requirements for electromagnetic compatibility (EMC). System changes or additions to this system not expressly approved by the manufacturer may cause EMC issues with this or other equipment.

high frequency devices may impair the use or the accuracy of the device or system. During the installation and use of the device or system should be observed known AF sources in the environment, including:

- radio and television stations,
- portable and mobile devices for wireless communication (cell phones, radios) and
- ray machines ray, CT scan or MRI machines

These devices also represent possible causes of interference as they may emit higher levels of electromagnetic radiation.

NOTICE

FAILURE OF EQUIPMENT - The use of mobile phones and other devices AF in the periphery of the system may cause unexpected or undesirable behavior.

Avoid the use of mobile phones and other devices nearby AF system.

NOTICE

Attachments or components - The addition of accessories or components to the system or the device or system modification can lead to an increase of radiation or reduced immunity of the device or system.

More information about EMS / CEM and AF can be obtained from the following sources:

O Reference Manual of spare parts and accessories
for your system

O Or authorized representatives GE Healthcare GE Healthcare

O Annex on electromagnetic compatibility in this manual
instructions.

biocompatibility

The system components described in this manual, including accessories that, when used as prescribed, come in contact with the patient meet the biocompatibility requirements of the relevant standards. If you have questions about this, please contact GE Healthcare or their representatives.

Information on spare parts and accessories

Ordering information and a list of products that are approved for use with this device, are in SEER 1000 -
Reference Manual of spare parts and accessories which are supplied with each recorder.

Manufacturer Responsibility

The manufacturer is only responsible for the results in terms of safety, reliability and performance if the following conditions are met:

- assembly, extensions, adjustments, modifications or repairs are performed by people they have been authorized to do so by GE Healthcare.
- The electrical installation of the relevant room complies with their standards.
- The system is used according to the instructions for use.
- GE Healthcare information is obtained, before connecting the equipment any devices that are not recommended in this manual.

Information on the product and packaging

This section describes where the labels used on your device and its packaging. First the symbols used on the labels are explained.

symbols

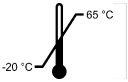
The following symbols can be found on the device and system packaging. To become familiar with the meaning of these symbols, you are ensuring a safe use and disposal of the equipment. The meaning of the symbols not listed here are the information of the original equipment manufacturer (OEM).

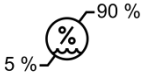
Symbols are used for the transmission of warnings, precautions, prohibitions, binding or information measures. A danger symbol on the product or packaging, with color codes indicate a specific threat or is a warning. All hazard symbols in black and white, existing on your device or on the packaging indicates a potential hazard and suggest a precautionary measure.

Symbol	Meaning
REF	**Catalog number or part number** refers to the catalog number or the number of manufacturer part.

Symbol	Meaning
	**Serial number** It refers to the manufacturer's serial number.
	**Manufacturer, name and address** It refers to the name and address of the manufacturer of the appliance.
	**Manufacturing date (year)** Refers to the original date of manufacture of this device.
	**Application Component type CF** It features a CF application component type in a medical device, which corresponds to the IEC 60601-1 standard. This device complies with electric shock protection requirements for a floating application component (floating), which is intended for cardiac use in contact with a patient.

Symbol	Meaning
IP43	**International Protection Code (Ingress Protection Rating)** Classifies and assesses protection against ingress of solid foreign bodies (such as body parts like hands and fingers, dust, accidental contact) and liquids. The first number (4) represents protection against solid objects, in this case, the protection against penetration of objects with a diameter above 1.0 mm. The second number (3) is the protection against the penetration of liquid, in this case, protection against sprayed water drop of 60 ° to the vertical. ***ATTENTION*** The DEGREE OF PROTECTION IS LIMITED TO THE FOLLOWING CONDITIONS - IP43 only applies if the battery cover is closed and locked and the ECG cable is connected properly to the recorder. Before starting recording, make sure that the battery cover is closed and locked and that the ECG cable is connected properly to the recorder.
	**CAUTION** SEE THE ATTACHED DOCUMENTS - There may be special warnings or precautions for the device, which are not on the label. Note the additional information on the safe use of the device in the supplied documentation.
	**Non-ionizing electromagnetic radiation** It indicates that the equipment for the diagnosis or treatment emits high levels of potentially dangerous non-ionizing radiation (electromagnetic energy).

Symbol	Meaning
	**Follow the instructions for use** Read and understand the operating instructions before using the device or product. As a sign of a binding measure this symbol is marked by a blue background and white symbol.
	**Temperature limits** It refers to the upper and lower temperature limit for the transport, storage and handling of the package. The threshold values are indicated on the side of the upper and lower horizontal line.
	**recyclable** It indicates that can recycle a material or device. Recycle or dispose of according to local, state or national laws.
	**Waste Electrical devices** It indicates that the system contains electrical or electronic components that must not be disposed of with household waste, but separately. You can get information about the disposal of your device from an authorized representative of the manufacturer.
Rx Only	**Rx Only** In the US a national law only allows the appliance to be used by a physician or under his order.
	**period of use compatible with the environment (Environment Friendly Use Period, EFUP)** It refers, in accordance with the standard Chinese SJ / T11363-2006, the number of years from the date of manufacture, during which you can use the product before it is probable that the limited traffic substances can leak and cause a potential environmental risk or health. **NOTE** If the device contains less than the maximum permissible concentration of substances limited traffic, the symbol is the letter "e". This is also known in China China RoHS.

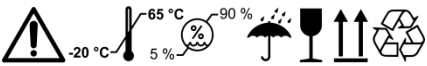
Symbol	Meaning
	**Japan RoHS** It indicates that the device or product complies with the Japanese provisions, which restricts or prohibits the use of certain substances in electrical devices. A green check mark (with G) refers to the fact that the product does not exceed the limits of hazardous chemicals.
	**Fragile** It refers to a fragile content. Handle with care.
	**On** It refers to the correct vertical position of a package.
	**maximum stack height** It indicates that one should not stack more than 5 product packages and that you should not put any weight on top of the upper package.
	**Do not stack** Stresses that one should not stack the product packages and you should not put weight on the package.
	**Protect from moisture** It indicates that it should protect the rain product packages and other sources of moisture.
	**humidity limits** Refers to the upper and lower limit of humidity. The limits are indicated next to the upper and lower horizontal line.
CE 0197	**CE marking** With the CE marking and the approval number CE 0197 is confirmed that the device complies with all relevant legislation and in particular with the requirements of Annex I to Directive 93/42 / EEC of medicinal products.

Symbol	Meaning
	**PCT marking (GOST-R)** Indicates that the device or the product complies with the GOST standards of Russia, apply for technology and security.
	Only Russia, Belarus and Kazakhstan. conformity marking for Eurasia. Accordance with the regulations of the Customs Union.
	**Approval FCC (FCC approval, US only)** It indicates that the device or the product meets the requirements of *"FCC Rule Part 18 Subpart B (18 203) - General information Regarding applications and AUTHORIZATIONS for industrial, scientific, and medical (ISM) equipment" (requirements for industrial, scientific and medical applications).*
	**TÜVRheinland** Indicates that the test of the TÜV (Technical Inspection Association), the device or the product complied with the technical requirements and applicable safety.
	**disposable alkaline battery** This symbol is selected in the SEER 1000 applications when a disposable alkaline battery is used.
	**Accumulator** This symbol is selected in the SEER 1000 applications when a NiMH battery is used.
	**Battery status** This symbol indicates the status of the battery or cell.
	**Home Recording** This symbol is used in Apple's iOS application to start recording.
•	**Home Recording** This symbol is used in Microsoft Windows application to start recording.

Symbol	Meaning
	**Recording stop** This symbol is used in the iOS app from Apple to stop recording.
•	**Recording stop** This symbol is used in Microsoft Windows application, to stop recording.
♀	**Female** This symbol is used in applications for female patients.
♂	**Male** This symbol is used in applications for male patients.
•	**Delete** This symbol is used in applications, to delete a patient or a technician.
• •	**Continue** This symbol is used in Microsoft Windows application, to call the next step.
• •	**Modify** This symbol is used in Microsoft Windows application, to change patient data or technical.
• •	**Search for** This symbol is used in Microsoft Windows application, to search for a writer to the wireless connection.
 •	**Event button** By pressing the event button on the recorder, recording inicwiada and when recording is already in progress, one without cardiac relevant event.

Where the labels

This section describes the labels and where they are on your device or its packaging. In the section " symbols "On page 20 are more detailed explanations.

	Label	Local	description
1		Rear apparatus	See " Rating plate " on the page 28.
2		Packing Information	expedition: • Product Designation • Serial number • Compliance with the authorities devices • manufacturer and distributor information
3		Packing Information	handling and safety, as well as the disposal of symbols
4		Product packaging approved with ANATEL	

Equipment Identification

Each of the GE Healthcare device has a type plate that contains the product name, part number, the manufacturer's information and the unique serial number. This information is necessary when you have to contact the service center GE Healthcare.

Rating plate

The type plate is applied, as shown. Depending on the product, aa type of plate can vary somewhat, but contains the same information.

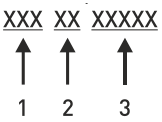
In the section " symbols "On page 20 are more detailed explanations.

Object	description
SEER 1000	Model
24 Hour	Recording duration
Distributed by (distributed)	GE Medical Systems Information Technologies, Inc.
Canada Private Label Manufacturer GE Medical Systems Information Technologies, Inc.	
2D barcode	Scan code with the following contents: Serial number (SN), part number (REF), "Global Trade Item Number" (GTIN), manufacturing date
FCC ID	Bluetooth module authorization ID of "Federal Communications Commission" (USA)

serial number and format of the product code

Each device has a serial number that uniquely identifies and at the same time provides important information about the device.

The following chart shows the serial number format:



Position	Name	description
1	product code	A three-letter code that identifies unequivocally the product line.
2	Year of manufacture	A two-digit code representing the year of device fabrication. Values between 00 and 99. For example, 13 = 2013
3	product sequence	A five-digit code that represents the sequence of production of the devices of this model. Values between 00101 and 99999

Information about maintenance

This section contains information about maintenance and system care. Familiarize yourself with this information before charge GE Healthcare or authorized representatives with the maintenance work.

Maintenance requirements:

If the people responsible, hospitals or institutions that use this device failing to implement an adequate maintenance plan, this can lead to device failure and potential security threats.

Regular maintenance is required, regardless of use, to ensure that the components of this system work when required.

It is the responsibility of the user, enter a possibly necessary maintenance by GE Healthcare or one of the authorized representatives.

warranty information

This product is distributed by GE Healthcare. The appliance should be serviced only by authorized service personnel of GE Healthcare. In the case of an inadequate repair of the device can cancel the existing security.

additional help

GE Healthcare offers a team, well-trained, expert applications and technical experts to answer your questions and to respond to problems that arise during installation, maintenance and use of this product.

If you need further assistance, contact your local GE Healthcare representative.

Information on this instruction manual

In this section are information about the proper use of this manual.

Always keep this manual near the equipment and read it carefully. If necessary, should request assistance in training at GE Healthcare.

manual Purpose of instruction

This manual provides the information required for setup and safe use, according to the function and the intended use of the device. The instruction manual is not intended as a substitute for a complete training on the product, but it is a complement. Please keep this manual always with the equipment. Upon request, are available additional electronic copies of the manual.

Conventions for the instruction manual

In this manual, the following conventions are used:

typographical conventions

The following table shows the conventions used in this document in other documents of GE Healthcare Diagnostic Cardiology and third-party products document, whose products are distributed by GE Healthcare Diagnostic Cardiology.

Convention	description
Bold	Indicates the keys on the keyboard to type text or hardware features, such as buttons or device key.
Bold and italics	Indicates terms of software, the menu items, input fields or options in different windows.
Key1 + KEY2	Indicates a keyboard input. A plus sign (+) between two key names indicates a combination of keys, ie, while a key is pressed, the second key is pressed and released then. For example, "C Press TRL + AND SC "To press the C key TRL and hold and then press the E key SC and release.
<Enter> key	It tells you to press the Enter key on the keyboard.
<Spacebar>	It tells you to press the spacebar. If you are instructed to enter a text string need, with one or more gaps, the places where the spacebar to press, are identified as follows: <spacer bar>. This ensures that the correct number of blanks to be inserted in the text to be entered. The purpose of the brackets (<>) is to separate the key name of the typed text.

Convention	description
>	The sign 'greater than', meaning the sharp angle on the right, is a common method for representing a sequence of menu options. For example, the statement "From the main menu, select ***System > Adjustments > Options,*** to open the window ***Option Activation*** "Replaces the following: 1. From the main menu, select ***System,*** to open the menu ***System.*** 2. Select from the menu ***System settings,*** to open the menu ***Settings.*** 3. Select from the menu ***Settings, options,*** to open the window ***Activation of the option.***

Illustrations

All illustrations in this manual serve only as examples. Depending on the system configuration, the display screens shown in the manual may differ from the actual on your system.

Grades

Contain instructions for use or information tips that are useful but are not essential for the correct functioning of the system. Notes are highlighted in the text body by a signal word and a retreat.

Other applicable documents

The following documents provide additional information that may be helpful in the installation, configuration, maintenance and use of this system.

Part Number Title	
2067634-132	SEER 1000 Reference Manual of spare parts and accessories
2067634-133	Brief instruction SEER 1000

2

Product Overview

This chapter describes the main features of the recorder. The following chapters provide the details.

Recorder App - General

The SEER 1000 recorder is available in three models:

- 24 hours (blue)
- 48 hours (purple)
- 7 days * (green)

* Long-term MARS ECG analysis system supports the ECG recording during a period of up to three days.

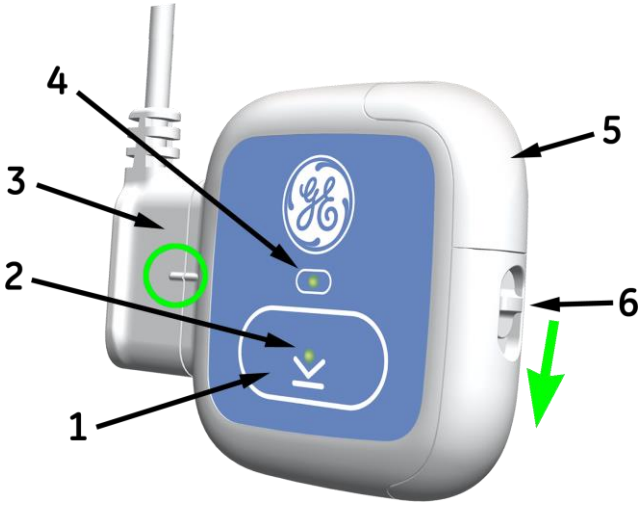
All recorders can record long-term ECG with 2 or 3 channels. The number of channels depends on the recorded ECG cables used.

The recorders automatically detect pacemaker pulses without the need and entries.

To exchange data wirelessly with an external recorder, there are external Apps for both Apple iPad, iPod or iPhone, as well as a standard PC with a Microsoft Windows operating system. Both Apps are used for the preparation of the patient to transfer patient data to a recorder to verify the signal quality and to start recording. The SEER 1000 recorder can also be used without using the Apps.

For the assessment, the ECG recordings can be read via a special USB cable to the PC.

Control elements of the recorder



1. Event button

2. LED event of buttons

3. combined **ECG cable connection** and **USB cable connection**

4. LED of electrodes

5. Battery compartment

6. battery compartment lock

Event button

This button has the following functions:

Function	The user action
Turning on / off the recorder	Press and hold the button for more than three seconds until you hear a beep. **NOTE** After recording has started, the recorder can only be switched off if the battery is removed. If the **Event button** It is pressed while recording is activated the wireless connection to the App.
Start a recording without the use of an application	Press the button and release it. A double beep confirms that recording has started.
During recording, select an event	Press the button and release it. An acoustic signal confirms that the event was logged.
Enable wireless connection to the App	Press and hold the button for more than three seconds until you hear a multiple acoustic signal. **NOTE** Before you start recording, the wireless connection is automatically activated. To enable the wireless connection during recording, press and hold the **Event button.**

LED event of buttons

This bicolor LED indicates the recorder status.

State recorder	Indication LED
Ready to record	illuminated in green
progress recording	intermittent flashes green
Event was marked (by pressing the **Event button)**	lights in green and off
existing recording	yellow lights
low battery	slowly flashes yellow
necessary assistance (Section " How to inform the service that the recorder is faulty "On page 109, are more detailed explanations.)	quickly flashes alternately in green and yellow

LED of electrodes

Before recording, this bicolor LED indicates the respective state of the electrodes:

State of electrodes	Indication LED
Electrodes connected correctly	illuminated in green
electrodes loose (Except for the electrode for grounding)	flashing yellow
progress recording	LED is off
necessary assistance (Section " How to inform the service that the recorder is faulty "On page 109, are more detailed explanations.)	quickly flashes alternately in green and yellow

NOTE

After connecting the recorder, the two LEDs light up for 0.5 second in green and then yellow to inform the user about their operational readiness.

acoustic messages

The recorder warns acoustically as follows:

state	**ringer**
tape recorder	simple acoustic signal
recording began	Double acoustic signal
The recording can not be started (Eg due to low battery, or because the ECG cable is not connected)	Three serious acoustic signals
event marked (by pressing the Event button)	simple acoustic signal
Wireless connection to the App is activated	Effect of acoustic signals
burner off	simple acoustic signal

3

Preparing for recording

This chapter provides information on how to inform the patient, prepare the patient's skin, correctly position the electrodes and start recording without the use of an App.

NOTE

Explanations of how to use the App to start recording, in the " Using the Apple iOS App "On page 61 and" Using Microsoft Windows App "On page 81.

Then, in step 6, you can use one of Apps to enter patient data and verify signal quality.

We recommend recording prepare the following steps explained in detail, below. Each step is explained in more detail in the following sections.

1. Explain to the patient the necessary precautions and recording protocol.

2. Prepare the patient's skin.

3. Apply the electrodes on the patient.

4. Connect the ECG cable to the recorder and the electrodes.

5. Enter a new battery in the recorder.

6. Connecting the recorder.

   O **LED event of buttons** should be green. O **LED of electrodes** should be green.

7. Start recording.

Inform the patient

It is the responsibility of the physician, the patient provide the safety information required for safe and effective ECG recording.

Safety notes for the patient

- Inform the doctor if any skin problems.

  In rare cases, there may be allergic reactions, even if they are used biocompatible electrodes.

- Do not leave the recorder is humid or wet. Protect it from adverse weather conditions. Do not take a bath or take a shower.

  The moisture can damage machine parts.

- Leave the recorder in her purse and, in the case of unfavorable weather conditions, wear it under a jacket.

- Do not expose the recorder to extreme temperatures.

  The operating temperature of the burner should not exceed 45 ° C even be below 5 ° C. In case of different climatic conditions, remains in the temperate areas as possible and place the recorder under clothing if it gets cold.

- To protect the burner against temperature changes or against humidity.

  Rapid changes in temperature or humidity may cause condensation. Do not place the recorder in a location near heat sources such as stoves or furnaces and do not expose it to direct sunlight.

- Do not bend the patient cable and do not wrap it around the recorder.

  The patient cable may be damaged as well.

- Keep away from electrical appliances.

- Do not use an electric blanket, when using the recorder.

Recording daily

In the journal header, data for patient identification for identifying the recording, as well as medication during recording should be recorded. In the diary of the patient, the patient should at least enter:

- every two hours their activities and their status
- each time he pressed the event button
- every pain, every discomfort, every feeling drowsy, each dizziness, palpitations, each trip to the toilet
- Intakes of medicines
- any strenuous activity such as running, heavy lifting, shopping or cycling
- the dominant or preferred sleeping position, or if you sleep on the right or left side of his stomach or back

Mark patient event

Explain to the patient that he should briefly press the **Event button** during recording to mark a patient event. A second tag can be used to mark the end of an event.

The doctor may use patient events to evaluate the ECG sections separately for certain periods or conditions.

Prepare the patient's skin

For free ECG recordings problems, the patient's skin should be carefully prepared.

1. Select the electrode arrangement for monitoring or diagnostic ECG, as specified by the clinic or doctor.

2. In the section " electrodes installation "Found on page 42
   diagrams and descriptions of the arrangement of electrodes.

3. Make sure that each point in which an electrode is applied,

It is certainly clean, dry and largely free of hair.

NOTE

Use a cloth lint-free cloth to dry the skin. If solvents are included in the electrodes, this can lead to unusual skin reactions.

4. Place the electrodes on prepared sites.

The electrodes must be applied only by physicians and ECG technicians.

NOTICE:

RISK OF ELECTRIC SHOCK - When the conductive parts are touched, the protection due to the isolated signal input is disabled.

Make sure that the conductive parts of electrodes wires do not come into contact with any other conductive parts.

5. See if the **LEDs electrodes** indicate any problems

electrodes

NOTE

Only use electrodes and adhesive materials, recommended by GE Healthcare.

electrodes installation

This section describes how to install electrodes to a long-term ECG with 2 and 3 channels.

CAUTION

CORRECTION RIGHT OF ELECTRODES CABLE - A wrong connection causes inaccuracies in the ECG.

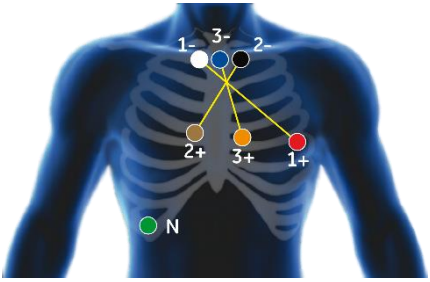
Use ties to relieve tension, to prevent the electrodes come out of its correct position due to tension in the cables of the electrodes.

Connect the electrodes with tape. So you can keep the electrodes to move and ensure electrical contact.

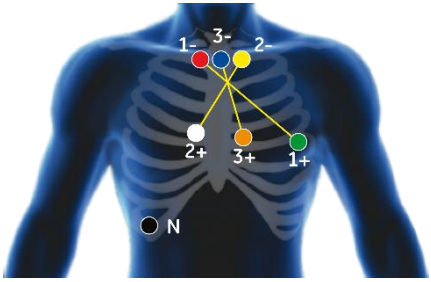
Attaching the tape loose enough so that no gel is pressed onto the adhesive surfaces of the electrodes.

Arrangement electrodes 7 to three ECG channels

Seven electrodes are placed and connected with lines of different colors to record an ECG three channels.



color coding AHA

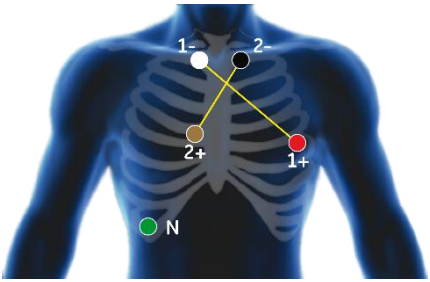


Color coding IEC

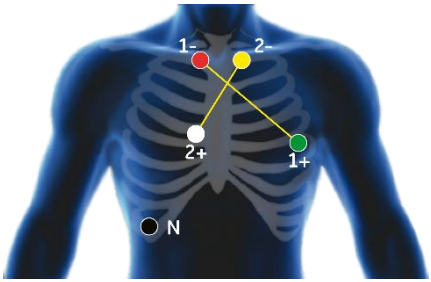
AHA colors	IEC color	Channel	Position
Red	Green	1 (+)	front left axillary line, fifth rib
White	Red	1 (-)	manubriosternal right edge right of the sternum
Brown	White	2 (+)	Right edge of the sternum, fourth rib
black	Yellow	2 (-)	The left edge of the sternum
Orange	Orange	3 (+)	The left edge of the sternum, the fourth intercostal space
Blue	Blue	3 (-)	upper sternum half
Green	black	Earth	bottom edge of right rib cage in bone

5 Electrode arrangement for two ECG channels

The five electrodes are placed and connected with lines of different colors to record an ECG two channels.



color coding AHA

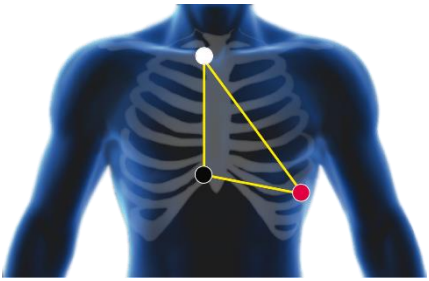


Color coding IEC

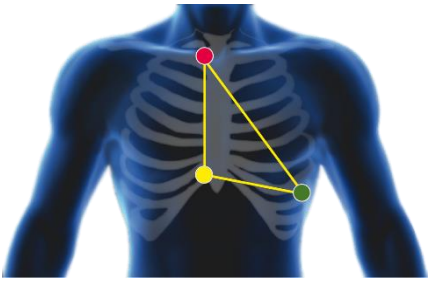
AHA colors	IEC color	Channel	Position
Red	Green	1 (+)	front left axillary line, fifth rib
White	Red	1 (-)	manubriosternal right edge right of the sternum
Brown	White	2 (+)	Right edge of the sternum, fourth rib
black	Yellow	2 (-)	The left edge of the sternum
Green	black	Earth	bottom edge of right rib cage in bone

Arrangement for recording electrodes 3 3 non-independent channels of ECG

To record ECG three non-independent channels, three electrodes are placed and connected with wires of different color.



AHA Color Coding



IEC Color Coding

Color AHA / Designation	Color IEC / Designation	Position
White	Red	manubriosternal right edge right of the sternum
black	Yellow	Right margin of the sternum, seventh rib
Red	Green	lower left thorax

Connect the ECG cable to the recorder and the electrodes

NOTE

When both LEDs flash three times per second, alternately green and yellow, the recorder is defective and needs a service assistance. In the section " How to inform the service that the recorder is faulty "On page 109 are more detailed explanations.

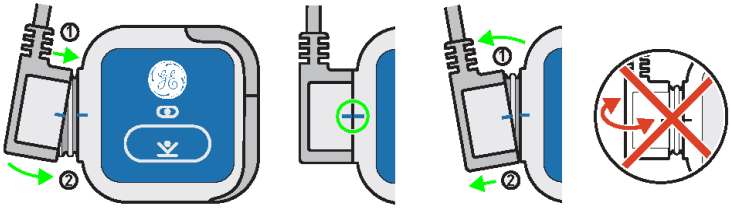
ATTENTION

DAMAGE TO CABOS- damaged cables are the most common cause of poor quality of the recordings.

Control cable before connecting the electrodes.

ATTENTION

DAMAGES IN CONNECTION AND RECORDER - The plug ECG cable or USB download cable can only be inserted in a position recorder. If the plug ECG cable or USB download cable is inserted incorrectly, this could cause serious damage to the machine. The damage caused by improper use are not covered.



The plug and the recorder are correctly positioned if the marks on the plug and on the recorder meet facing each other, as shown by the green circle on the image. Do not insert the plug in any other position.

For an insert or easier removal of the plug, it is recommended that the plug is inserted or removed in two steps, as shown by the green arrows in the image.

Never twist the angle plug toward the front or rear of the recorder, as shown by the red arrows in the right image.

ATTENTION

DAMAGE IN CONNECTION CABLE AND - Excessive force can damage the connection and cable.

Never use force to insert the patient cable or the USB cable to the recorder. Do not bend the patient cable and do not wrap it around the recorder.

If the plug ECG cable or USB download cable is inserted incorrectly, this could cause serious damage to the machine. The damage caused by improper use are not covered.

Place the stack

ATTENTION

RECORDING OF TIME MIGHT NOT BE ACHIEVED - To achieve the complete recording period of 7 days, a full battery or a fully charged battery is required. A low quality cell and without an appointment or an accumulator that is not fully loaded, could not last seven days.

Before each recording the **LED event of buttons** should be green. If it flashes once per second, a new battery is needed or a new battery.

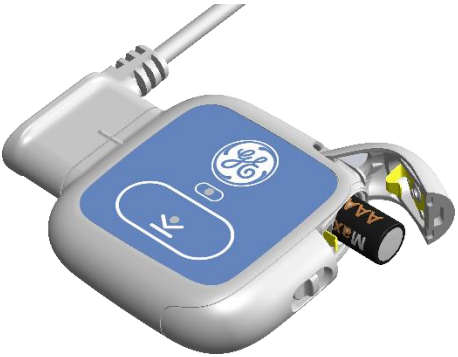
ATTENTION

NO BATTERY CHARGER - The recorder is not designed to charge a battery.

Only use the battery when it is fully charged.

Slide the **battery compartment lock** back.

Insert the battery or accumulator, as shown below, with the negative end up in the recorder.



Replace or replace the battery cover

To open the battery compartment, you must slide the **battery compartment lock** back, as shown in the previous section.

If the **the battery cover** is more open, it is separated from the recorder housing.

To replace or replace the battery cover, hold the cover as shown in the graph below left and press it into its compartment.

ATTENTION

RECORDER DAMAGE - The **the battery cover** It can only be inserted into the recorder in one position.

hold the **the battery cover,** as shown in the following chart. Do not attempt to again **the battery cover** in another location.

Connecting Recorder

press **Event button** in the center of the recorder housing, to turn on the recorder.

NOTE

When both LEDs flash three times per second, alternately green and yellow, the recorder is defective and needs a service assistance. In the section " How to inform the service that the recorder is faulty "On page 109 are more detailed explanations.

Start recording

press **Event button** in the center of the recorder housing, to start recording.

CAUTION

SIGNAL QUALITY - For the case that the ECG presents severe muscle tremors or artifacts when you lightly touch the electrodes or when the patient moves, it may be that the electrodes are not fixed properly.

Attaching the electrodes correctly again.

ATTENTION

RECORDING OF TIME COULD NOT BE REACHED - To achieve the complete recording period, a new battery is needed or a fully charged battery. An alkaline battery of low quality and without brand name or a fully charged battery might not endure not seven days.

Before each recording the **LED event of buttons** should be green. If it blinks yellow, once per second, a new battery is needed or a fully charged battery.

NOTE

If the recorder is still recording an earlier filed, recording may not start. The recording must be erased before it can proceed. A recording can be erased using the App or long-term ECG analysis software.

NOTE

If you have an App, it can also start this recording with her, having chosen or added a patient and after having tested the signal quality.

In the following chapters are more information about Apps:

" Apps - General information "On page 55

" Using the Apple iOS App "On page 61

" Using Microsoft Windows App "On page 81

Auto-Start

If a recording has not yet been started, but at least there is a valid signal of a channel, the recorder automatically starts after eight minutes.

The eight minutes of time period begins again,

- each time that a wireless connection is established,
- when the cable status changes (eg, if the cable is connected or disconnected, or
- **when the Event button It is pressed, but recording does not start due to a low battery** electrodes or a loose connection. (Three serious acoustic signals).

NOTE

If the recording was started automatically, you can no longer access the patient data or the ECG information through the App. Previously, the recording should be interrupted and the data must be deleted using the MARS or CardioDay analysis software.

NOTE

Even if the auto-start function prevents a patient use the recorder in vain, we recommend starting each recording properly and consider the auto-start function only as collateral.

auto Power Off

If no recording is started, if no action is taken and no valid signal is present, the recorder automatically turns off after eight minutes.

The eight minutes of time period begins again,

- each time that a wireless connection is established,
- when the cable status change (for example, if the cable is connected or disconnected) or
- if **the event button** is pressed, but recording can be started due to a low battery, or due to a loose connection electrode (three serious acoustic signals).

4

Measures after the end of the recording

The recorder automatically turns off when it reaches the set recording time.

CAUTION

LOSS OF DATA - The recorder stores data for at least one week after the end of the recording.

Make sure that data is transmitted and deleted before assigning the recorder to another patient.

Turn off the recorder before the end of the recording

NOTE

Without the use of an App, a recording can only be terminated early if the battery is removed.

If the battery is removed before it was reached the recording time, the recording ends at this point, but it is, however, stored correctly.

For information about how to end a recording using an App, see " The tab "Devices "On page 78 (for iOS Apple App), or page 94 (for Microsoft Windows App).

drop electrodes

CAUTION

AVOIDABLE SKIN IRRITATION HAZARD - In many cases, the electrodes are very firm after a long-term ECG.

Solve each electrode to avoid skin irritations, slowly and carefully by its outer edge and then pull it gently. To release pushbuttons or plug connectors, never pull on the cord but always grasp the plug.

Import recording to PC

NOTE

Do not pull the USB cable during data transfer.

NOTE

If you turn off the recorder while it is still connected to the USB port on your PC, you should disconnect the USB connection, so it can be shut down completely.

Use the USB cable to connect the recorder to a PC on which the analysis and evaluation software is installed. The correct handling is explained in section " Connect the ECG cable to the recorder and the electrodes ", Page 46.

Since the recorder performs various internal tests, one must wait until the **Event button LED** is highlighted in yellow, before starting to import the data into your software. This can take up to 10 seconds.

If you connect a recorder to the USB port on your PC, a USB driver will be installed. This process will be repeated, connect it to another recorder of the same computer port.

Read the instructions for use of the software analysis and evaluation of reading and data import.

Compatible Evaluation Software

The data stored on the devices are compatible with the evaluation software GETEMED CardioDay 2.4 (and higher) and the ECG system GE Healthcare MARS Ambulatory V8.0 SP3 (and higher).

5

Apps - General information

your Apps are available. A works under the operating system Apple iOS on an iPod touch, iPhone or iPad. The other works as an independent software on a PC under the Microsoft Windows operating system®.

ATTENTION

PATIENT PRIVACY - Demographic data and medical patient are subject to special provisions.

Note that in some countries, consent is required in writing by patients or their representatives before entering the data into a patient database or evaluate your medical data.

ATTENTION

SOFTWARE VIRUS - Systems and software are checked for viruses before delivery. However, they can be infected by viruses.

We recommend the following:

O Install a powerful antivirus scanning program and update it regularly.

O Through appropriate steps, avoid software that has infected by viruses from entering your computer. Check, for example, the exact origin of any software used and use only original software.

O Do not install the software on a computer that is
regularly used to transmit information from the Internet.

O Store patient data and recording at intervals
Regular by appropriate storage procedures.

NOTE

You can not read a recorder recording using the Apps. Recordings are read using the evaluation software MARS or CardioDay.

Functionality

Both apps offer the following features:

- establish a secure wireless connection to a recorder
- transferring patient identification and demographic data to a recorder
- download the technical ID to a recorder
- display recorder settings
- set the duration of recording
- define the type of battery, disposable battery of 1.5 V or accumulator Rechargeable 1.2 V
- display the battery status
- display on the recorder patient data stored
- display the date and time of the internal clock of the recorder
- set the date and time of the internal clock of the recorder
- display the cable color code and the ECG waves
- inform the technician if the battery is not sufficiently charged for a new recording
- inform the technician if the previous recording has not yet been eliminated
- delete a recording and patient data from a recorder

- define the function with which the data is imported from a recorder and automatically deleted after imported

Data exchange between the Apps and engravers is wireless.

Privacy policy

For data protection, both Apps use an access control with two password protection levels. On the first level is used the administrator password and the second level, the password for the ECG technician. Because these passwords are set, is described in the " Change the administrator password ", Page 62. (App for the Apple-iOS) or page 83 (for PC App).

data protection in the App

Only a qualified ECG, which was assigned a ***Technical ID,*** It has access to the App.

Only the administrator can enter one ***Technician ID*** and assign it to a technician ECG.

The ECG technician enters the default password specified in this user's manual and change it to your personal password. After that, only the administrator can reset the technical password.

Data protection on the recorder

If the data exchange with a recorder has been established through an App, a protection code is transferred to the recorder, which is automatically generated, using the administrator password. From there access to the recorder it is only possible with an App with the same administrator password.

Access is blocked until the patient and the ECG data is downloaded by MARS or CardioDay and then deleted from the recorder. Thus, ECG technicians, who are supervised by only an administrator, have, at any time, access to recorders other technical ECG. People outside the control of the administrator, have no access and, when trying to connect, receive the error message "The password stored in the recorder does not match the password of the current administrator."

NOTE

If the administrator change the password, there is no possibility of access to recorders that is protected by password previous administrator, until the data has been downloaded and deleted.

NOTE

If the recorder has been turned on automatically or if it has been turned on manually, with **the Event button It is automatically generated a protection code by the recorder. In this** case, there is no wireless access until the data has been downloaded and deleted.

If access to a recorder is locked because an ECG technician has established a connection to a recorder out of the administrator's control, you can perform a reset of the recorder: the **explanations are, depending on the App used in the "** Reset iOS App **", Page 106, or in the"** Reset with Microsoft Windows App **"Page**

107.

Users of CardioDay CardioDay can also use CardioDay rather than an App to transmit patient data to the recorder before recording begins. If, moreover, the CardioDay administrator use the same password as the administrator of the App, ECG technicians can use your Apps to exchange data with these recorders.

Basic information about the wireless Bluetooth connection

ATTENTION

DOES NOT IDEAL - If you are using a Bluetooth device, which was not supplied by GE Healthcare, can not be guaranteed optimal operation.

Use only the supplied Bluetooth equipment from GE Healthcare, because the Bluetooth technology has been tested and proven with this equipment.

Note that even when using Bluetooth equipment provided that a complete data transmission, when using Bluetooth wireless technology can not be guaranteed in all circumstances and there may be bandwidth losses when wireless technology Bluetooth devices and other high

frequency (e.g., WLAN) are used, each of the other nearby. Other devices can also interfere with the system, even if they meet the CISPR emission requirements.

ATTENTION

When used with the Bluetooth connection, the recorder consumes more electricity and desired recording time, intensive, can not be achieved.

NOTE

Windows administrators can find more information about the Bluetooth connection in the " Using a Bluetooth adapter "On page 82.

If Bluetooth connection interruptions, try the following:

- Keep a distance between the apparatus not less than 0.5 m and not more than 10 m.
- Remove any objects from the line of sight between the two devices.
- Remove any devices that may interfere with the radio transmission, the proximity of the two devices.

Once the recorder is connected, the Bluetooth connection remains active until the start of recording.

NOTE

Do not pull the USB cable during data transfer.

After recording starts, the Bluetooth connection is disabled. It can be activated again during recording by pressing the event button for more than 3 seconds. This way you can check the signal quality at any time.

6

Using the Apple iOS App

If the administrator has prepared the application for use by an ECG technician, you can continue as explained in section " Start the application and change the technician password "On page 68.

Install and configure the application

The App SEER 1000 is supported by many iPad, iPhone and iPod touch. If the App is available for your mobile, you will find its description in the App Store.

Install and launch the application

1. Tap the icon to open ***App Store.***
2. look for the ***SEER 1000 Mobile App.***
3. tap ***Install.***
4. Tap the application icon to launch the application.

NOTE

Make sure that Bluetooth is enabled on your iOS device. Open, on your Apple device, the menu ***Settings,*** select ***Bluetooth*** and ensure that the Bluetooth function is turned on.

Change the administrator password

The application is password protected against inadvertent access the recorder. GE recommends that you change the default password on your first login. Use the same password administrator to connect all the software programs supported by the recorder (App iOS, PC App, CardioDay and CardioRead). The password is transmitted to the recorder with patient data and serves to protect data from unauthorized access.

ATTENTION

UNAUTHORIZED ACCESS TO THE RECORDER - The administrator password is used to protect the recorder against unauthorized access.

Always change the password, if necessary, for example, if you have been advised to unauthorized persons.

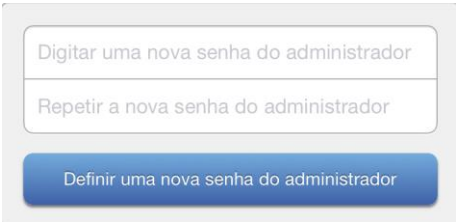
NOTE

Only the administrator can create ***Technical IDs*** or reset to the default password.

The application is always open with window ***Login.***

When the application starts for the first time, you are prompted to enter the ***Administrator standard password.***

1. Enter the password ***Administrator standard: 14012013***
2. tap ***Continue.***



3. Replace the ***administrator password standard,*** typing your new password.

   The new password must be at least eight characters.

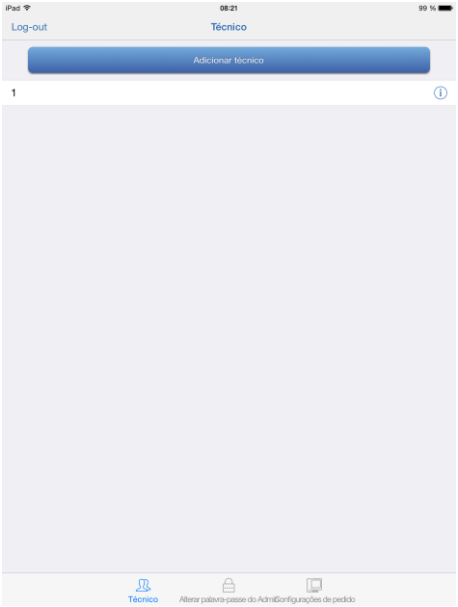
4. tap ***Set a new administrator password.***

   Opens the window ***technician.***

Add technical or reset the password coach

Only the application administrator can add ***Technical IDs*** and reset to the default password.

After the administrator has logged in, the window appears ***Technical.***



Below the window ***Technical*** They are presented three selection fields: ***Add technical,*** As explained in this section, ***Change Password Admin,*** and ***application settings.***

- In the section " Change the administrator password ", Page 62, is information relating to ***Change password Admin.***
- In the section " Configure the connection to MUSE wish list "Page 66, finds the information on ***application settings.***

To create a new ***Technical ID,*** follow these steps:

1. tap ***Add technician.***

2. type the ***technician ID.***

3. tap ***To save.***

4. tap ***Leave,*** to return to ***technical record.***

If a technician logs on for the first time you will be asked to set a new password. The technical standard password is ***20,130,114.*** The new password must be at least eight characters. Then, the technician can use the application.

To reset the password coach, run as administrator, the following steps:

1. Log on as administrator.

   tap ***Administrator*** in the upper right corner and enter the administrator password.

2. Tap the entry to the technician.

3. tap ***Reset password.***

   The password for this coach is reset to the default password ***20,130,114.***

4. tap ***To save.***

5. tap ***Leave,*** to return to ***technical record.***

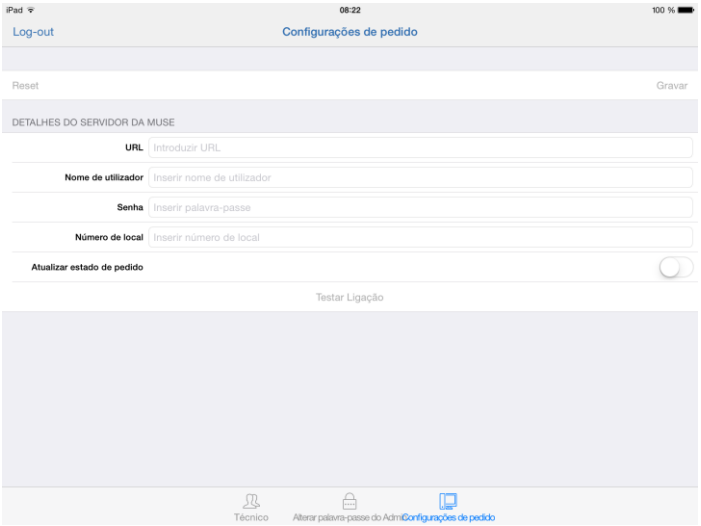
Configure the connection to MUSE wish list

When working with MUSE examination requests, you can access applications through the App iOS.

To do this, you must first connect the list of MUSE applications with App:

1. Log in as administrator.

   Click in the upper right corner ***Administrator*** and enter the administrator password.



2. In down menu bar on the screen, select the menu ***configurações request.***

3. Enter the settings for the connection order interface WebAPI MUSE. Contact the administrator of your MUSE website or service personnel of GE Healthcare for information on the correct configuration settings.

   URL must be entered as the base URL for the REST interface, followed by the port number, for example http://192.168.0.20:8100 or http://MUSEComputer.domain.com:8100.

NOTE:

both are supported URL with host names as IP addresses. The IP port number WebAPI service (default 8100) must be part of the URL configuration.

click in ***Test Connection,*** if you want to test the connection to the configured MUSE wish list. As a result, the message appears
MUSE connection test was successful or ***MUSE connection test failed.***

4. Select the request for examination of the state in order MUSE list should be changed after the start of recording. With ***Update request for state*** determining in the MUSE configuration settings, if the request status is changed when the application is downloaded to a recording or when recording is started.

If you select the setting ***Off,*** the status of the request remains ***Open*** and it is not changed when a recording request from this MUSE starts. With the state of the application
Open, the application will continue to be displayed as a result when the function ***question order*** is again executed. In this mode workflow, other recordings may be initiated from this application.

If you select the setting ***Switched on,*** the state of the application changes ***Open*** for ***Pending*** when a recording request is initiated from this. Once, to see the list of applications, they are only displayed MUSE applications with the application state

Open, an application with the request to state ***Pending*** It does not appear in later MUSE queries. MUSE application status must be updated manually after being sent a report to MUSE.

5. tap ***Save*** to save your settings.

Reset the application

If the administrator forgets the administrator password, the system can be reset to the default settings.

ATTENTION

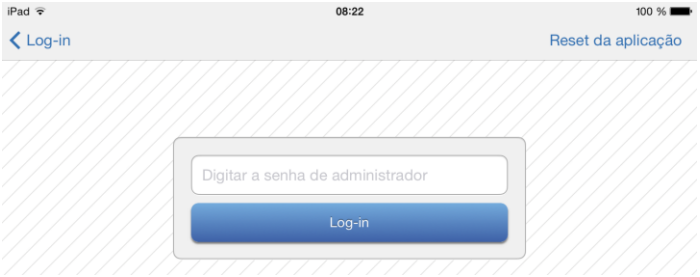
The function ***Reset the application*** will erase all data and reset the application to the default settings.

An application reset:

- will reset ***administrator password*** for the default password,
- will erase all the technical IDs and passwords,
- will erase all patient data stored in the application,
- will erase all information stored recorder.

To reset the application:

1. tap ***Reset the application*** in the window ***Administrator.***



2. Enter the ***Password manager Standard: 14,012,013.***

3. tap ***Continue.***

Start the application and change the technician password

NOTE

Make sure that the external Bluetooth adapter is installed.

The application is password protected against inadvertent access the recorder. By registering for the first time, overwrite the default password and replace it with your new password.

1. Tap the application icon to open the application.

2. type the ***Technical ID,*** that the administrator has set for you.

3. Enter the default password: ***20,130,114.***

4. tap ***Register.***

5. replace the ***default password,*** typing your new password.

   The new password must be at least eight characters.

Save technical ID

When the function ***Save technical ID*** is enabled, the App features in the field ***Technical ID*** the latest technical id connected and you only have to insert the password.

To change technician, delete the ***Technical ID*** Existing and enter a ***Technical ID*** new.

Drag the circle on the right side to the right, until the icon is displayed in blue.

The tab "Patient" - Prepare and start ECG recording

If you prepared the recording as described in the " Preparing for recording "On page 39, you can use the guide ***Patient*** to start recording.

Once you have registered, appears to guide ***Patient.***

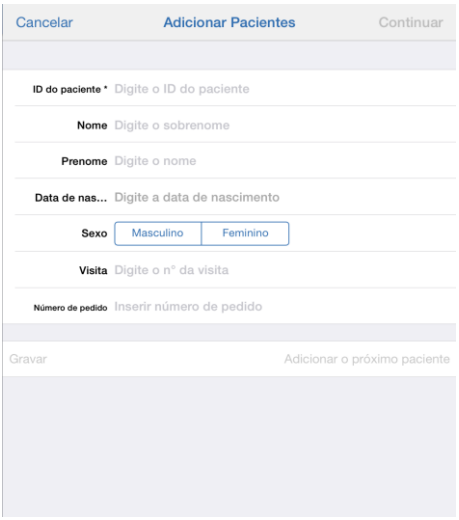
Select your patient and continue as explained in section " Find device ", Page 74.

Add patients

You can enter patient data manually or, if your app is correspondingly configured, collect patient data from MUSE applications.

Enter patient data manually

1. tap ***Add patient,***



2. enter patient data in the window ***Add patient.***

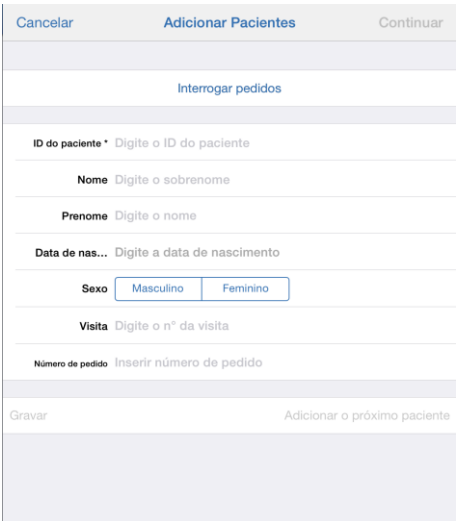
   You must enter at least ***Patient ID.***

If you added a patient has three options: ***Continue Save*** or ***Add next patient.***

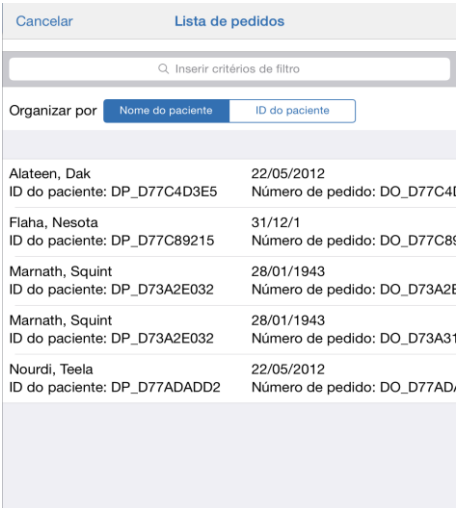
- tap ***Continue*** to continue, as explained in section " Find device ", Page 74.
- tap ***Save*** to include this patient in the patient list.
- tap ***Add next patient*** to add another patient.

Collect patient data from applications MUSE

If your app is configured to query the list of orders and collect patient data from the MUSE request list is displayed in the window ***Add patients*** the option ***Interrogating requests.***



click in ***question order*** to open the applications list.



NOTE

MUSE only are applications for long-term ECG recordings to the state ***Open.*** If no application meets this criterion, the list will be empty.

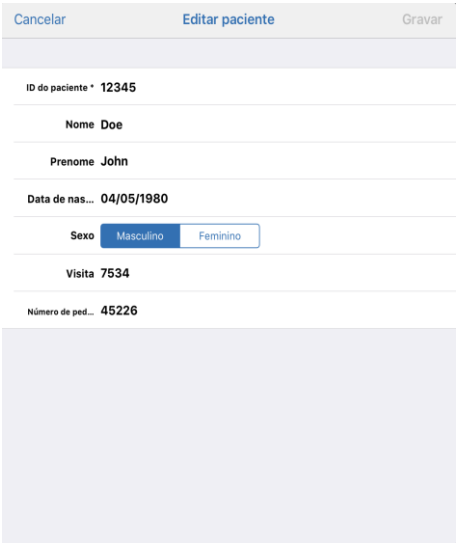
Select your patient and continue as explained in section " Enter patient data manually ", Page 71.

Change or delete patient input

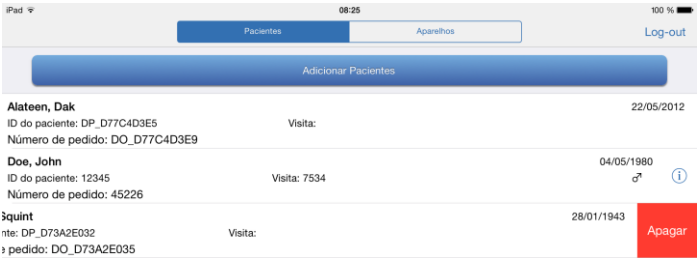
NOTE:

The inputs of patients were collected from MUSE requests can not be changed, so it is not presented any information icon ⓘ near the entrance.

To change a patient input, touch the Information icon ⓘ, shown on the right of the entrance. Opens the window ***Edit patient,*** in which realizes and saves your changes.



To delete a patient entry, swipe from right to left on the patient input selected. Then tap the field ***Delete,*** shown on the right of the entrance.



Find device

Once you have selected a patient, the window is displayed ***Find device.***

1. If the recorder is not connected, press the **Event button** until you hear a beep.

2. tap ***Find device.***

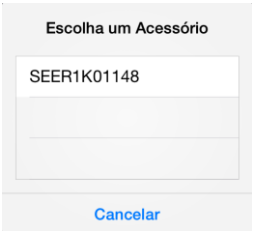
The recorder's input is displayed in the window ***Select accessory.***

NOTE

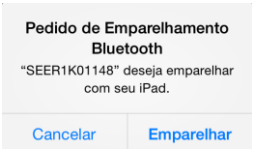
It may take a few seconds to several minutes to find a device. This depends on how many Bluetooth devices are available in the area and other electronic conditions.

3. Tap the recorder's input to select the recorder.

The recorder's input is displayed in the device list.



If you selected the recorder in the accessory list, the recorder and the App iOS are paired via Bluetooth. If the recorder has not yet been paired with the App iOS, iOS operating system prompts the user to confirm the pairing request Bluetooth.



If a SEER recorder has been found and paired successfully with App iOS, it appears in the list of connected devices.

4. Select the desired recorder from the list of connected devices to switch to the **overview. In the section "** Arrangement of electrodes and signal quality **", Page 76, the** following steps are explained.

NOTE:

When the recorder is already recording or when you save a recording, a warning is displayed.

Arrangement of electrodes and signal quality

NOTICE

CURVES QUALITY DIAGNOSTIC ECG - ECG curves displayed in the preview window are designed exclusively for evaluating the signal quality.

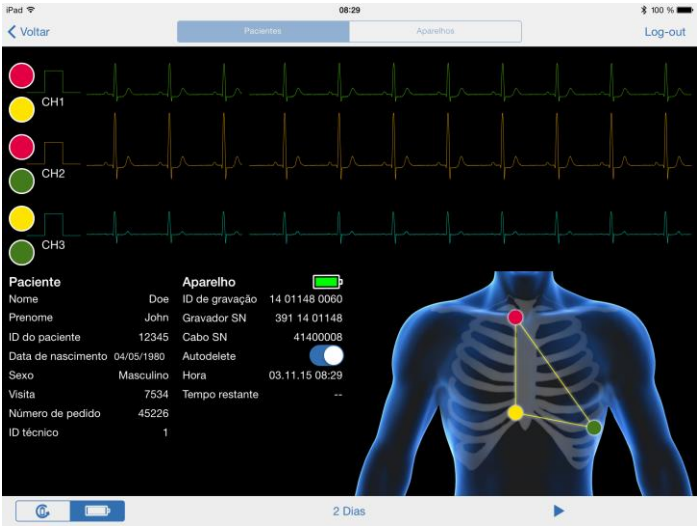
Do not use these preview curves for diagnostic purposes.

CAUTION

SIGNAL QUALITY - If tapping the electrodes cause severe muscle interference or artifacts, or if they result from the patient's movements, it is possible that the electrodes are not properly protected.

To improve the accuracy of analysis, ensure that the QRS complex channel displays a large amplitude. If the amplitude is small, the electrodes move to find a suitable position for arrangement of the electrodes.

The application shows the image of a torso with the layout of electrodes recommended. The system automatically detects the type of cable and shows the corresponding arrangement of the electrodes. Double-click the ECG curve or trunk, to increase or decrease the presentation again.



The two corresponding electrodes are shown to the left of each curve. If an electrode is loose, it appears a red line around the respective pair of electrodes and a red indicator on the trunk.

Double-click the ECG curve to increase or decrease the presentation again.

Check or change the settings

With the application you can select or change the type of battery and recording time.

Select a disposable battery or accumulator

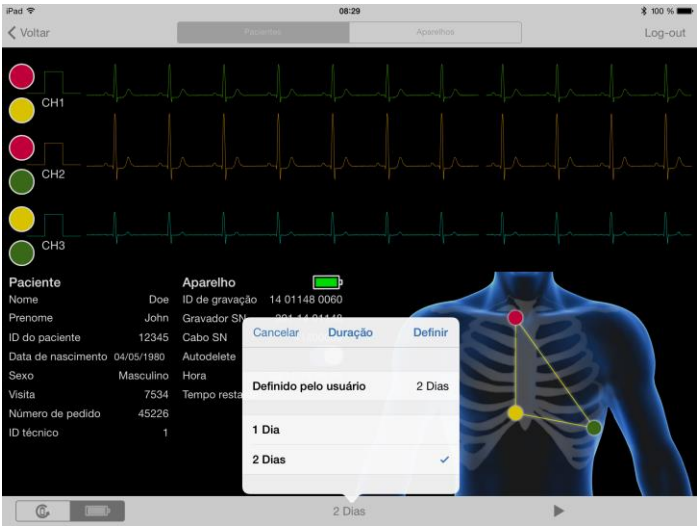
For an accurate indication of battery status, select the icon in the lower left corner of the window, if a disposable battery or accumulator is used.

	disposable alkaline battery standardized
	NiMH battery

Select the recording duration

To select the duration of recording, tap the field in the middle below and select the desired number of days. If you want to select another

recording duration, tap ***Pelousuário defined,*** to the desired time and tap ***To define.***



The autodelete option

The option ***autodelete*** It is a burner configuration. The default setting is recorder ***On AutoDelete.*** The application detects when it has changed.

To delete records automatically after being read into the analysis system, select ***On AutoDelete.***

To erase recordings manually after they have been read in the analysis system, select ***Autodelete Off.***

Start recording

Tap the starting field in the window  down to start recording.

If the battery status is not enough, a message appears and recording can not be started. Insert a new battery.

The tab "Devices"

tab ***devices,*** you can establish a connection to a recorder, a recording is recording or in which is still stored.

NOTE

If the recorder is already recording, you must activate the Bluetooth module recorder by pressing the **Events button** for more than three seconds until you hear a multiple acoustic signal.

- tap ***Find device*** to engage new recorders to the application.

- If you select the list of the recorder, you can:

  O while recording ***ECG,*** to view

  O patient data, the number recorder series, the number
  cable series, the time of the recorder and battery status,

  O stop and erase recordings or delete patient data -
  stored and

  O start a recording patient data stored
  the recorder or without patient data.

Use the following icons to start, stop or delete a recording.

	Match
	Stop
	Delete

7

Using Microsoft Windows App

If the administrator has prepared the application for use by an ECG technician, you can continue as explained in section " Start the application and change the technician password "On page 87.

Install and configure the application

NOTICE

POSSIBLE DISTURBANCES - A safe and effective use of SEER 1000 Mobile Application is only possible with the appropriate hardware.

The PC used should correspond to the latest version of the international standard IEC 60950.

Hardware Specifications

The hardware used must meet the following minimum requirements:

Component	Specification
PRAÇA	AT IBM compatible PC with Pentium III or higher
Operational system	Windows 8, 8 Pro (32 bit and 64 bit) Windows 7 (SP1) Home, Professional, Ultimate (32 bit and 64 bit) Windows XP (SP3) (32 bit)
CPU cycle frequency	1 GHz
RAM	1 GB
Available space in the 5 GB hard drive	

Component	Specification
Screen	1024 x 768 pixels
CD drive	required
Interface	USB interface for Bluetooth adapter
Keyboard	Standard PS / 2, USB or wireless
Mouse	Standard PS / 2, USB or wireless, 2 or 3 keys
installation means	1 CD

Using a Bluetooth adapter

The PC application only works with the Bluetooth drivers from Microsoft. After connecting the Bluetooth adapter available for the PC, the USB port, it is detected by the Bluetooth drivers from Microsoft.

All other Bluetooth drivers must be disabled.

A module already installed, for wireless data transmission, must be turned off

If your PC is equipped with an internal Bluetooth module, this must be turned off before the USB adapter is connected.

Consult your system administrator or do the following:

1. Click the Windows field ***Start.***
2. click in ***Settings.***
3. click in ***System control*** and select ***manager device.***
4. Double-click ***Bluetooth connections.***
5. Select the Bluetooth driver installed, with a right click and select ***Off.***
6. Insert the Bluetooth adapter into the USB port.

Install and launch the PC application

1. Insert the installation CD into the CD driver and follow the instructions on the screen.

   If the auto-start function is enabled on your PC, you should call the CD using Windows Explorer and double-click
   setup.exe to start the installation.

   When the installation is complete, the PC application icon appears on the screen.

2. Double-click the icon to launch the PC application.

You can display the version of the application, placing the mouse cursor over the GE logo at the top left corner of the application window.

Remove PC App

To remove the PC application, open ***System control*** on the PC, select ***Add and Remove Programs*** or ***Programs and resources*** and remove ***SEER 1000***

If the application is installed again later, the administrator password and the previously created technician are restored. If all previous adjustments are to be deleted, follow the instructions in the " ***application reset*** "Later in this chapter.

Change the administrator password

The application is password protected against inadvertent access the recorder. By registering for the first time, overwrite the default password and replace it with your new password.

ATTENTION

UNAUTHORIZED ACCESS TO THE RECORDER - The administrator password is used to protect the recorder against unauthorized access.

Always change the password, if necessary, for example, if you have been advised to unauthorized persons.

NOTE

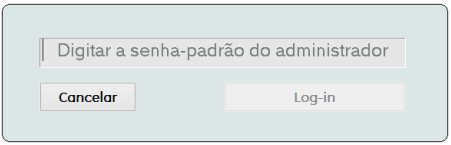
Only the administrator can create ***Technical IDs*** or reset to the default password.

The application is always open with window ***Login.***

1. If you start the application the first time, you will be prompted to enter the ***default administrator password.***

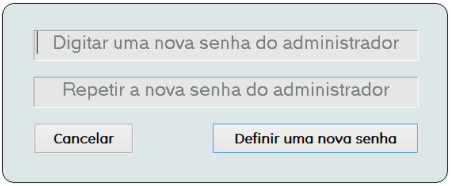
   This is necessary to create a new technical or technical reset passwords.

2. Enter the ***default administrator password 14,012,013.***



3. Replace the ***administrator password standard,*** typing your new password.

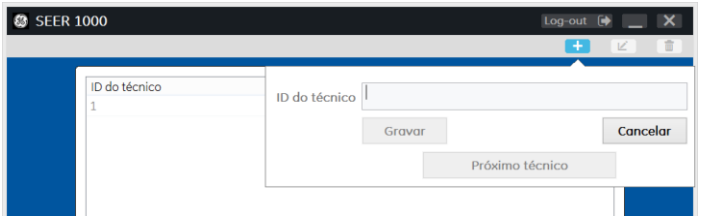
   The new password must be at least eight characters.



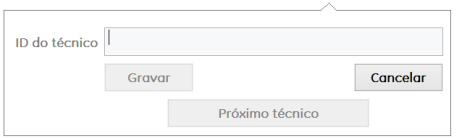
Add technical or reset the password coach

Only the application administrator can add ***Technical IDs*** and reset the passwords for the default password.

1. Click the symbol •• to create a new ***technician ID.***



2. type the ***technician ID.***



3. click in ***Next technical,*** if you want to enter another ***ID technician.***

4. click in ***to save,*** to set the ***Technician ID*** and close the dialog.

5. click in ***Cancel,*** to return to the technical record.

If a technician logs on for the first time you will be asked to set a new password. The technical standard password is ***20,130,114.*** The new password must be at least eight characters. Then, the technician can use the application.

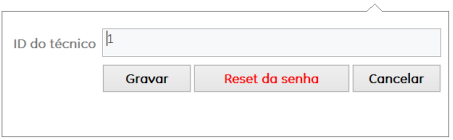
To reset the password coach, run as administrator, the following steps:

1. Log on as administrator.

   tap ***Administrator*** in the upper right corner and enter the administrator password.

2. Select the coach on the list.

3. Click the symbol •• to open the window ***Edit technician.***



4. click in ***Reset password.*** The password is reset this technical to technical default password ***20,130,114.***

5. click in ***To save.***

6. click in ***Cancel,*** to return to the technical record.

Reset the application

If the administrator forgets the administrator password, the system can be reset to the default settings.

ATTENTION

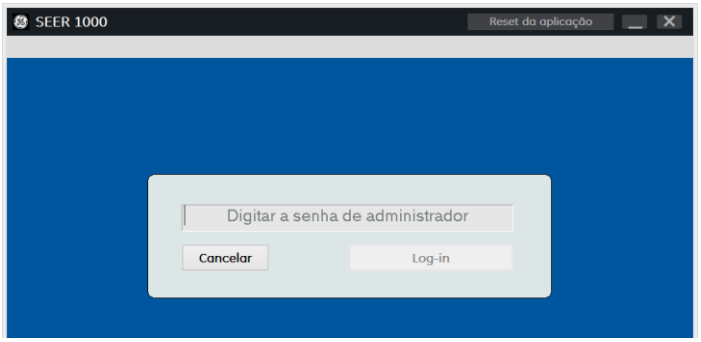
The function ***Reset the application*** will erase all data and reset the application to the default settings.

An application reset:

- will reset ***administrator password*** for the default password,
- will erase all the technical IDs and passwords,
- will erase all patient data stored in the application,
- will erase all information stored recorder.

To reset the application:

1. tap ***Reset the application*** in the window ***Administrator.***



2. Enter the ***default administrator password 14,012,013.***

3. click in ***Register.***

4. Confirm the query.

Start the application and change the technician password

NOTE

Make sure that the external Bluetooth adapter is installed.

The application is password protected against inadvertent access the recorder. By registering for the first time, overwrite the default password and replace it with your new password.

1. Click the application icon to open the Microsoft application Windows.

2. type the ***ID,*** that the administrator has set for you.

3. Enter the default password: ***20,130,114.***

4. tap ***Register.***

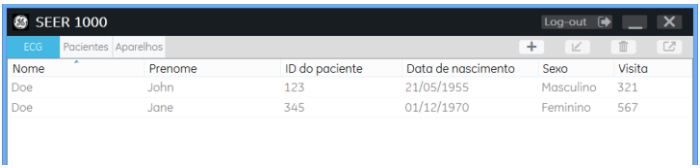
5. replace the ***default password,*** typing your new password.

   The new password must be at least eight characters.

Prepare and start the ECG guide - ECG

If you prepared the recording as described in the " Preparing for recording "On page 39, you can use the guide ***EKG*** to start recording.

Once you have registered, appears to guide ***EKG.***



Add or select a patient, connect to a recorder

1. Click the symbol •• to add a new patient.

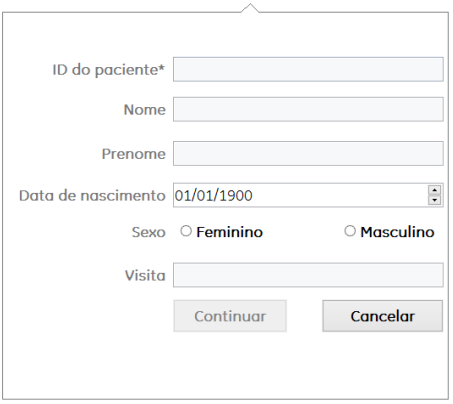
2. Enter patient data.

   If you must enter at least the ***Patient ID.***

   Use the Tab key to move between the inputs.

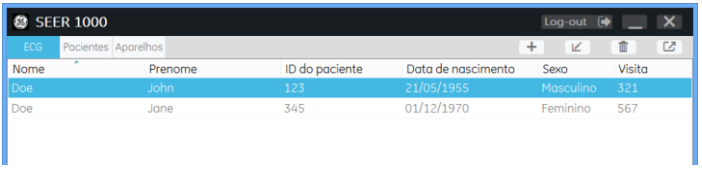
   In the field ***Date of birth,*** you can use the keypad to enter the date, or you can select the day, month and year with the arrow keys <left> and <right> and then use the

arrow keys <up> and <down> to change values.



3. click in ***Continue*** if you want to start a recording
   this patient.

4. To the patient, you want to start a recording, was previously entered an application, **double-click the patient's name or click on the patient entry, and then click the icon • .**



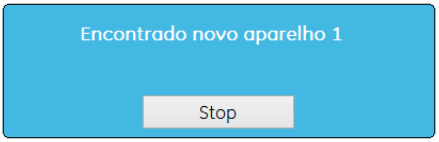
5. **press Event button to turn on the recorder.**

6. **Click the symbol • to start the device search.**

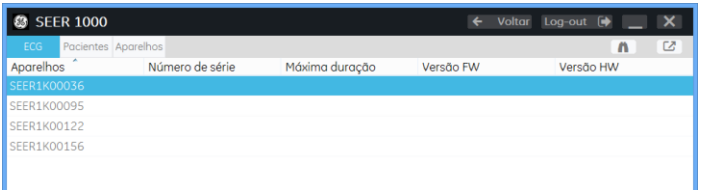
NOTE

It may take a few seconds to several minutes to find a device. This depends on how many Bluetooth devices are available in the area and other electronic conditions.

7. click in ***Cancel,*** if the message (***Amount)***
new devices found the message ***New devices are sought.***



8. Double-click on the recorder's input or click the entry
the recorder, and then click the icon •.



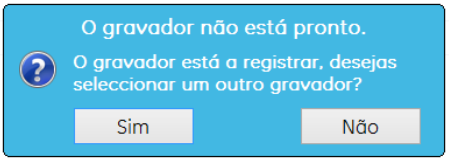
By registering for the first time you will be asked to enter the PIN code 1234, or to confirm the PIN code that is displayed. This is the prerequisite for a Bluetooth connection to this unit can be made.

In the following section, the next steps are described.

If the connection can not be established, you are prompted to try again.

NOTE

When the recorder is recording, or if a recording is still stored, a warning is displayed.



Arrangement of electrodes and signal quality

NOTICE

CURVES QUALITY DIAGNOSTIC ECG - ECG curves displayed in the preview window are designed exclusively for evaluating the signal quality.

Do not use these preview curves for diagnostic purposes.

CAUTION

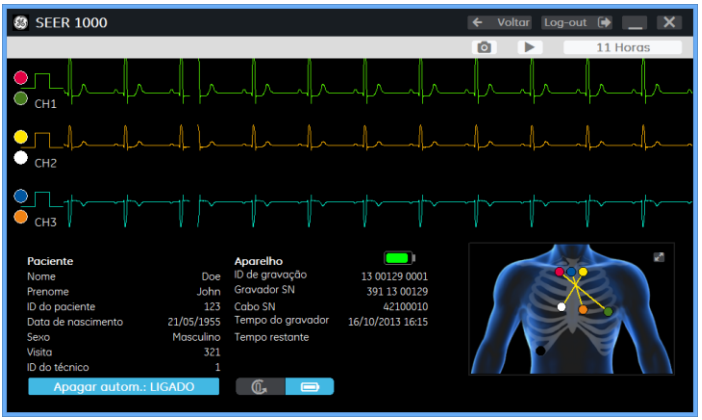
SIGNAL QUALITY - If tapping the electrodes cause severe muscle interference or artifacts, or if they result from the patient's movements, it is possible that the electrodes are not properly protected.

To improve the accuracy of analysis, ensure that the QRS complex channel displays a large amplitude. If the amplitude is small, the electrodes move to find a suitable position for arrangement of the electrodes.

The application shows the image of a torso with the layout of electrodes recommended. The system automatically detects the type of cable and shows the corresponding arrangement of the electrodes. Double-click the ECG curve or trunk, to increase or decrease the presentation again.

NOTE

Click the symbol • to generate a curve print preview screen for documentation. The impression of ecrão is stored in the Windows clipboard.



The two corresponding electrodes are shown to the left of each curve. If an electrode is loose, it appears a red line around the respective pair of electrodes and a red indicator on the trunk. Double-click the ECG curve or trunk, to increase or decrease the presentation again.

Check or change the settings

With the application you can select or change the type of battery and recording time.

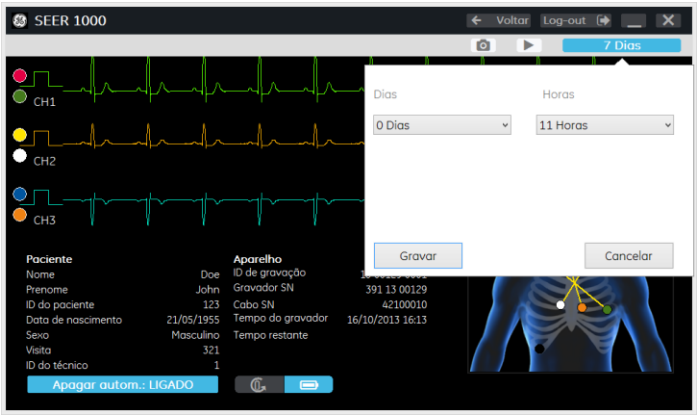
Select a disposable battery or accumulator

For an accurate indication of battery status, select the icon in the lower left corner of the window, if a disposable battery or accumulator is used.

	disposable alkaline battery standardized
	NiMH battery

Select the recording duration

To select the recording period, click the field at the top of the window, select the number of days and hours and click ***To save.***



The autodelete option

The option ***autodelete*** It is a burner configuration. The default setting is recorder ***On AutoDelete.*** The application detects when it has changed.

To delete records automatically after being read into the analysis system, select ***On AutoDelete.***

To erase recordings manually after they have been read in the analysis system, select ***Autodelete Off.***

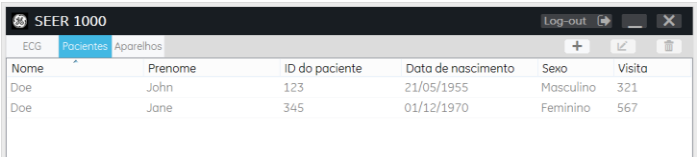
Start recording

Click the start symbol • at the top of the window to start recording.

If the battery status is not enough, a message appears and recording can not be started. Insert a new battery.

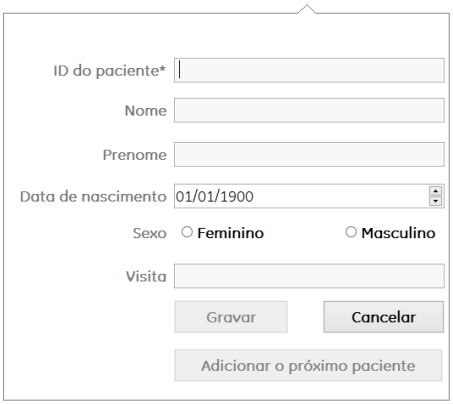
The tab "Patient"

tab ***Patient*** You can view, modify and delete patient records. In addition, you can add patients for subsequent recordings.



- To view the patient list, click on the tab ***Patients.***
- To delete a patient recording, select the patient and click on the symbol •.
- To change a patient recording, click the icon ••
  introduce changes and save.

  If you must enter at least the ***Patient ID.***



- To add a patient, click the symbol • and enter patient data. Then you have two options:

  O To save the recording of the patient and return to the list
  patients, click ***To save.***

  O To add more patients to the patient list, click
  Add next patient

The tab "Devices"

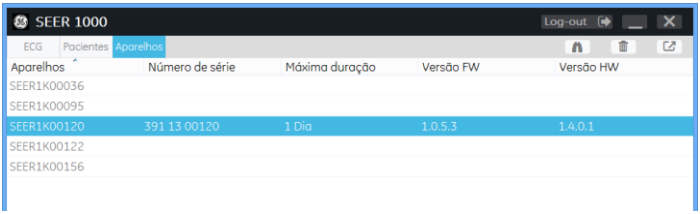
tab ***devices,*** you can establish a connection to a recorder, a recording is recording or in which is still stored.

NOTE

If the recorder is already recording, you must activate the Bluetooth module recorder by pressing the **Events button** for more than three seconds until you hear a multiple acoustic signal.

NOTE

The informations ***Serial number*** and ***Maximum,*** as well as the software and hardware information are not displayed before the recorder and the application being coupled for the first time.



Double-click the device entry or click the device entry, and then click the icon •.

- If you select the list of the recorder, you can:

  O while recording ***ECG,*** to view

  O patient data, the number recorder series, the number
  cable series, the time of the recorder and battery status,

  O stop and erase recordings or delete patient data -
  stored and

  O start a recording patient data stored
  the recorder or without patient data.

To delete a list of the recorder, select the recorder and click on the symbol •.

Use the following icons to start, stop or delete a recording.

•	Match
•	Stop
•	Delete

8

Problems solution

This section describes the error signals and provides recommendations for troubleshooting.

Recorder Troubleshooting

error signal	Cause	Recommendation
At **LED event keys** blink once per second. An acoustic signal sounds error when trying to start recording.	The voltage disposable battery or accumulator is too low.	The disposable battery is low or the battery is not sufficiently charged, or a stack has been inserted wrong type. Place a new disposable alkaline battery ouum sufficiently charged NiMH battery.
The **LED electrodes** blink in yellow, once per second. An acoustic signal error if you try to start recording.	At least one electrode is loose or ECG cable is not connected.	Connect the electrodes to the loose ECG cable, or connect the ECG cable to the recorder.

error signal	Cause	Recommendation
At **LED event keys** They are lit in yellow.	A previous recording or an entry from a previous patient was not cleared.	Delete a previous recording record or previous recordings or previous data of the patient. Use to this, during ECG analysis software prazoou SEER 1000 App.
O **LED event button** will stop flashing green during the set recording period.	The recording was automatically stopped before reaching the duration of the scheduled recording.	Possibly the recording was started with a low battery. Save or delete the recording and insert a new battery to start a new recording. Make sure the machine is damaged. Please contact the customer service center if the device is damaged.
At **LED event keys** **and LED electrodes** flash three times per second, alternately in green and yellow.	Recording can not be started. The self-test was not successful.	More details can be found in the " How to inform the service that the recorder is faulty "On page 109.

Application error messages

Message	Recommendation
"The password stored in the recorder does not match the administrator password."	The recorder is at the moment, protected by a protection code, which was generated from another administrator password. Use an application that is controlled by the correct administrator password, or ask your administrator to reset the recorder to the Microsoft Windows application. Can not reset the recorder to the Apple iOS App. **NOTE** If the administrator has changed your password, no longer have access to their recorder, which is protected by the old password until the data has been read or deleted. **NOTE** If the recording was started automatically or manually with the button event is automatically generated a protection code by the recorder. Wireless is not possible until the data has been read or deleted.
"The password is too short. The password must be at least 8 characters. "	Enter a new password of at least eight characters.
"Passwords do not match."	Repeated password must be identical to the first password entry.
"Error while deleting the recording."	Try again. Possibly the wireless connection has been broken.

Message	**Recommendation**
"Error deleting data. Please make sure the recorder is connected via USB to a different software. "	When the recorder is connected via USB connection with a long-term ECG analysis software, for example, for example to read a record, wait until the data transfer is completed. Then you should disconnect the USB cable before trying again, delete the data.
"Error setting the recorder's password."	Try again. Possibly the wireless connection has been broken.
"Error setting the recording time."	Try again. Possibly the wireless connection has been broken.
"Error setting the cell type."	Try again. Possibly the wireless connection has been broken.

Message	Recommendation
"Error start recording."	• If the recording is running (LED event keys flash flashing green), no response was not recorded by the recorder application. The patient was not automatically deleted from the list after the start of recording. In this case, go to the tab "Patient" and delete the patient record manually. • If the recording is not running, but the ECG waveforms are displayed (LED event keys lit in green), try to start recording again. • If the recording is not running and are not displayed ECG curves, repeat the process and start by choosing the patient.
"Error saving the setting to automatic cancellation."	Try again. Possibly the wireless connection has been broken.
"Error saving patient data."	Try again. Possibly the wireless connection has been broken.
"Error when the recorder reset."	Try again. Possibly the wireless connection has been broken.

Message	Recommendation
"Connection error."	Make sure Bluetooth is turned on the recorder and try again. Make sure the Bluetooth device is enabled on your Apple iOS. Make sure that your device (Microsoft Windows and Apple iOS) is no longer connected to another Bluetooth device. Disconnect on your Microsoft Windows device any embedded Bluetooth module. Explanations are in the " A module already installed, for wireless data transmission, must be turned off "On page 82.
"Recorder" SN "can no longer be attached to this PC. Want to repeat the coupling to this recorder? "	(Microsoft Windows message) Select "Yes". The coupling is carried out automatically.
"Technical ID not found."	The technician ID does not exist. Please enter a valid technician ID.
"There is already a technician with the same ID."	Enter a new coach id.
"Battery level too low to start recording."	The disposable cell is too weak for the set recording time or the battery is not sufficiently charged, or the wrong type of battery is inserted. Insert a new disposable alkaline battery or a NiMH battery with sufficient power or decrease the recording time.

Message	**Recommendation**
"Battery level too low, recorder is not turned off."	Insert a new disposable alkaline battery or an NiMH battery that is sufficiently charged.
"The recorder is recording, you want to select a recorder differently?"	a recording is already in progress. Stop and delete the recording, or select a different recorder.
"The recorder is not connected to this device. Please repeat the coupling to this recorder. "	(Apple iOS Post) 1. Close the application. 2. Call the "Settings" menu. 3. Select the "Bluetooth" tab. 4. Select the "Ignore this device" option. 5. Select the recorder. 6. Repeat coupling to the recorder.
"The data are stored on the recorder, you wish to select a different recorder?"	Erasing the data stored on the recorder or transfer them to a long-term ECG analysis software. You can also select a different recorder.
"Incorrect password."	The password is incorrect. Try a valid password.
"Technical wrong or bad password."	Technical ID does not exist or the password is incorrect. Try a combination of valid technician ID and password.

Bluetooth connection failures

error signal	Cause	Recommendation
Error connecting recorders and applications	The recorder and the application of the device are very close or very distant	For best results, the devices do not place at a distance of 0.5 m between them at a distance of not more than 10 m between them.
	The Bluetooth function of the application device is not connected.	Make sure that the Bluetooth function of the device application is turned on.
	Objects between the recorder and the application of the device damage the connection.	Remove all line of sight of the objects between the recorder and an application device.
	AF Interference Device environmental harm the connection.	Remove any devices that emit interference AF vicinity of the recorder device and application.
After the start of recording is not active any wireless connection.	The Bluetooth function of the device is not connected. It is turned off after recording starts.	Press and hold the event button for about 3 seconds, until a series of beeps indicates that the wireless connection is enabled.

Connection faults MUSE

error signal	Cause	Recommendation
MUSE connection test failed in the configuration. Missing field ***question order*** in the window ***Add patients.***	incorrect URL.	URL must be entered as the base URL for the REST interface, followed by the port number, for example http://192.168.0.20:8100 or http://MUSEComputer.domain.com:8100 .
	incorrect hostname or incorrect IP address.	Make sure that it is using the correct host name or the correct IP address of the MUSE system.
	The host name to search for IP address (DNS) does not work.	Ensure that the determination / hostname of the search on iOS device works. Try to enter the IP address of the MUSE system in the URL.
	a wrong IP port was used to WebAPI MUSE.	The correct port number WebAPI service (default: 8100) must be part of the URL configuration.
	Service WebAPI MUSE not active.	Ensure with the MUSE administrator or technical assistance from GE that WebAPI MUSE service is correctly configured and works without error.
	The username or password do not match any valid user MUSE.	Ensure that the configured user and password correspond to a valid user MUSE.
	Another network communication error or locked door.	Check for other network communication errors, restrictions or firewalls.
No patient MUSE / no request for examination in the order list.	Incorrect number of office configuration.	Ensure that there are MUSE applications with the number of correct office.
	No long-term ECG application with the state ***Open.***	Ensure that there are MUSE applications with properties: TestType Holter = Status = OPEN.

Bluetooth messages Microsoft Windows System

Some problems setting up the Bluetooth connection between the PC and the recorder are reported by the PC operating system. The application attempts to propose a solution, but may be the cause of the problem can not be determined at all. In this case, they are displayed system messages and their error codes. Messages and error codes can be read by the Windows system administrator.

You can try the following:

- Make sure Bluetooth is turned on the recorder and try again.
- If a recording being performed, press and and hold the event button for approx. 3 seconds, until a series of beeps indicates that the wireless connection is enabled.
- Disconnect on your Microsoft Windows device any embedded Bluetooth module. Details can be found in the " A module already installed, for wireless data transmission, must be turned off "On page 82.

Reset iOS App

ATTENTION

To reset the recorder, all data will be erased from the recorder and the protection code is reset.

You can reset the recorder as follows:

1. Turn on the recorder.
2. Start the application.

3. Type "Administrator" in the first line of the window ***Register.***

4. Enter the ***administrator password*** the second line.

5. click in ***Register.***

   Opens the tab ***Patient.***

6. Switch to tab ***Devices.***

7. If the recorder that you want to perform a reset does not appear in the list, click **Search appliance.**

8. If the recorder that you want to perform a reset appears in the list, click the information icon, displayed on the screen, click ***Reset.***

A message confirms that the recorder is reset.

Reset with Microsoft Windows App

ATTENTION

To reset the recorder, all data will be erased from the recorder and the protection code is reset.

You can reset the recorder as follows:

1. Turn on the recorder.

2. Start the application.

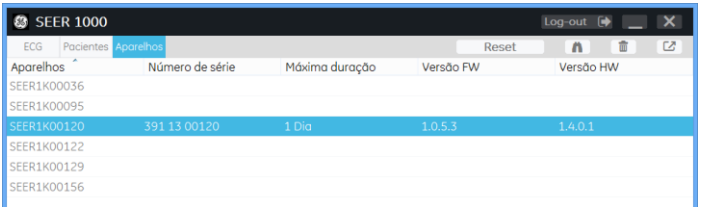
3. Type "Administrator" in the first line of the window ***Register.***

4. Enter the ***administrator password*** the second line.

5. click in ***Register.***

   Opens the tab ***ECG.***

6. Switch to tab ***Devices.***



7. Select the recorder.

8. If the recorder that you want to reset does not appear in the list, click the symbol •.

9. With the recorder you want to reset, appears in the list, click the Writer entry, and then click ***Reset.***

A message confirms that the recorder is reset.

How to inform the service that the recorder is faulty

If the recorder is faulty, this is detected during self-test after turning on. If the self-test during a fault is detected, the following sequence flashing LED warns that a problem was detected:

- Both LEDs flash yellow.
- Both LEDs flash yellow.
- Follows a 2-second pause.
- At **The LED of the event keys** flash green.

If a defect of this type, please contact the Technical Support GE. Based on the number of times that the **LED event of keys** flash green, the support service personnel can determine the type of defect.

The following table shows, which defect is often indicated by a flashing LED.

Error number (number, frequency of blinking LED)	**Error**
1	The CRC (Cyclic Redundancy Check, self-test firmware) has not bemsucedido. The firmware must be re-installed.
2	The internal memory is defective or has a problem in the welding points.
3	One or more internal device clocks are not working properly.
4	The exchange of data between the microprocessor and NAND memory is faulty.
5	The NAND memory has too many bad memory blocks.
6	Data exchange with the Bluetooth module is defective.
7	The real time clock had detected a fault. Disconnect and reconnect the recorder. This can correct the fault.

9

Maintenance

Perform the following maintenance procedures as described.

Perform daily by visual inspection. If verified that any parts need to be repaired, contact an authorized service representative GE Healthcare so that repair work can be carried out.

Attention indications

ATTENTION

EQUIPMENT DAMAGE - Some chemicals can damage the plastic housing of the device and cables. Moreover, some substances are conductive or electrically insulating, and may affect the signal quality.

- Use only detergents and disinfectants according to the manufacturer's instructions. Follow especially all the rules necessary for dilution.
- Squeeze out excess disinfectant cloth before use.
- Never immerse the appliance, or the ECG cable ECG electrode lines in liquids. This can lead to corrosion of the metal contacts and affect the signal quality.
- The device connection contacts should not accumulate liquid. In such cases, absorb the liquid with a soft, lint-free cloth.
- Do not use, otherwise, ether solvents such as acetone or gasoline.

- To clean the device, the ECG cable or line electrodes should not ever be used conductive solutions, or solutions containing chlorides, wax or wax components.

- Do not use solutions or products, containing ammonium chloride compounds, such as:

  O benzyl ammonium chloride Dimethyl

  O Solutions containing quaternary ammonium chloride

  O Solvents or abrasive cleaners of any type

  O Acetone

  O ketone

  O betadine

  O Sodium Salts

- Device, cable lines and electrodes must never be sterilized by autoclaving or steam.
- Do not use any of the accessories, if they are not completely dry.

Clean and disinfect recorder

Note the following for the recorder cleaning:

- Remove the battery before cleaning the device.
- Clean the device before disinfecting the surface.
- For the external cleaning of the device, use a cloth, lint-free, lightly moistened with water and mild soap solution.
- Disinfect the device before first use, before passing the device on to another person and at regular intervals.

  Use the following disinfectants in accordance with the APIC guidelines (1996) for the selection and use of disinfectants:

  O Sodium hypochlorite (domestic bleach 5.2%), minimal dilution
  1: 500 (at least 100 ppm free chlorine) and maximum dilution of 1:10.

O Any sodium hypochlorite solution that meets all criteria of the policy.

- The device and accessories must not be sterilized.

Cleaning the recorder's bag

One can wash the bag by hand or 60 ° C in the washing machine.

Leave the bag completely dry after washing.

Do not dry the bag in a clothes dryer.

Cleaning, disinfection and storage of ECG cables

It is also important, in addition to the cleaning and maintenance of the system, keep the cables and lines cleaned and disinfected electrodes. This section provides instructions for cleaning, disinfection and storage of cables and electrodes lines, to extend its life and to protect patients.

The correct cleaning and disinfecting will prolong the life of the cables and lines of electrodes. If the wrong cleaning agent is used, or if the procedures are not respected, this can cause the following problems:

- damage or corrosion,
- degradation of signal quality,
- product discoloration,
- corrosion of metal parts,
- fragility of cables and connectors,
- shortening the life of the cables and lines of electrodes,
- apparatus malfunctions and
- loss of warranty.

Clear ECG cable

Proceed as follows to clean the cable:

1. Before cleaning, the cable pull device.
2. Clean the cables with a cloth moistened with a mild soap solution or alcohol with 70 volumes.
3. Clean the surfaces with a clean cloth or paper towel.

Disinfect ECG cable

Proceed as follows to disinfect the cable:

1. Before cleaning, the cable pull device.
2. Please use the following disinfecting solution, according to the APIC guidelines (1996) for the selection and use of disinfectants:
   - Sodium hypochlorite (domestic bleach 5.2%), minimal dilution of 1: 500 (at least 100 ppm free chlorine) and maximum dilution of 1:10.
   - Any sodium hypochlorite solution that meets all the criteria of the directive.
3. Clean the surfaces with a clean cloth or paper towel.

Storing ECG cable

Always store the cables, hanging them vertically in a dry, well-ventilated area. Do not wrap the cord around the device.

Clean the battery contacts

If the battery voltage, despite using a new battery, or a fully charged battery, appears to be low, it is advisable to clean the battery contacts. Use a slightly damp cotton swab with alcohol 70 volumes.

Check the ECG cables and connections

Check ECG cable and connections every month, linking them to an ECG simulator.

THE

Technical data

This section lists the technical data of the SEER 1000 ECG recorder.

General

Component	**description**
recorded channels	Two or three ECG channels, depending on the type of cable connected, pacemaker pulses
Detection of pacemaker	On all channels
Recording duration	24 hours, 48 hours or 7 days, depending on the model
Lead-off detection	Yes
defibrillation protection No	
connections	1 ECG and USB connection combined
LEDs	Event buttons, LED electrodes
keys	1 key to on-off, as well as to mark patient events
Time, until the data is read	Within a month

Component	description
Accuracy of time	± 30 seconds per month (If a recording is started by the application, clock is synchronized with the application of the device clock, on departure of recording)
storage means	digital memory, permanently installed
data exchange means	USB 2.0

Electronics

Component	description
Battery Type	1 x disposable alkaline battery LR03 / AAA 1.5 V 1 x HR03 / AAA 1.2 V NiMH battery 1000 mAh
Replacement frequency range	0.05 to 70 Hz
analog to digital converter	1024 Hz, 12-bit (2.93 uV)
ECG data storage with	256 Hz, 12-bit (2.93 uV)
ECG input voltage range	± 6 mV
synchronization suppression	CMRR> 80 dB per channel
Input Impedance	> 10 M

mechanical

Component	description
dimensions	Height: 63 mm Width: 70 mm Width without line: 81 mm Depth line: 18 mm
Weight	Without battery 50 g, 60 g with cell
Material	ABS / PC (housing)

Component	description
Protection against ingress of foreign bodies and liquids	IP43
Vibration Tolerance	During use: 0.5 g (10 to 20 Hz) out of use: 3.0g (100 to 300 Hz)

Environmental conditions

Component	description
During operation	5 to 45 ° C
Humidity during operation	relative air humidity 10 to 90%, non-condensing
Ambient pressure during operation	106-50 kPa
Temperature during storage	- 20 to 65 ° C
air humidity during storage	relative air humidity 5 to 90%, non-condensing

Bluetooth Module

Component	description
Transmission process	Bluetooth 2.1 + EDR, Class 2
reach	Up to 10 m in open field
Frequency range AF	From 2400 to 2483.5 MHz ISM band
Input signal	- 82 to -20 dBm
Output power	- 11-6 dBm

Specifications IEC 60601-1-2 EMC as

General specifications table 201

Directives and manufacturer's declaration - electromagnetic emissions		
The device is designed for use in the electromagnetic environment specified below. The customer or the device user must ensure that it is used in such an environment.		
Measurements of emissions	**Compliance ELECTROMAGNETIC ENVIRONMENT - Policies**	
AF emissions CISPR 11	Group 1	The device uses HF energy only for its internal function Therefore, its HF emissions are very low and are not likely to suffer near electronic equipment due to interference.
AF emissions CISPR 11	Class B	The SEER 1000 is exclusively intended for use in all establishments, including domestic establishments and those directly connected to the PUBLIC POWER SUPPLY, which also supplies buildings used for domestic purposes.
IEC 61000-3-2 harmonic vibration as	Not applicable	
Voltage fluctuations / flicker IEC 61000-3-3	Not applicable	

General specifications table 202

Policies and MAKER statement - RESISTANCE TO INTERFERENCE ELECTROMAGNETIC			
The device is designed for use in the electromagnetic environment specified below. The customer or the device user must ensure that it is used in such an environment.			
test electromagnetic interference	**Test level IEC 60601**	**matching level**	**ELECTROMAGNETIC ENVIRONMENT DIRECTIVES**
discharge Electrostatic (DE) according to IEC 61000-4-2	• Contact discharge 6 kV • 8 kV air discharge	• Contact discharge 6 kV • 8 kV air discharge	Floors should be wood, concrete or ceramic. If floors are covered with synthetic material, the relative humidity should be at least 30%.
rapid and transient quantities of electrical interference / IEC 61000-4-4 Bursts as	• 2 kV network cables • 1 kV for cable entry and exit	Not applicable	The supply voltage should correspond to the quality of a typical commercial or hospital environment.
Transient voltage (Surges) according to IEC 61000-4-5	• Voltage of 1 kV between the external-conductive external conductor • Voltage of 2 kV between the external ground conductor,	Not applicable	The supply voltage should correspond to the quality of a typical commercial environment or a hospital environment.
Voltage drops, short interruptions and variations in the supply voltage according to IEC 61000-4-11	<5% UT for ½ period (> 95% decrease) 40% UT for 5 times (60% decrease) 70% UT for 25 peroxides (30% decrease) <5% UT for 5 s (> 95% which gives)	Not applicable	The quality of the supply voltage should correspond to a typical feed or a commercial environment of a hospital environment. If the device user require a continuous FUNCTION, even during power supply interruptions, it is recommended that the device be powered from an uninterruptible power supply or a battery.

Policies and MAKER statement - RESISTANCE TO INTERFERENCE ELECTROMAGNETIC			
Field Magnetic with power frequency (50/60 Hz) IEC 61000-4-8	3 A / m	Not applicable	If there are faults it may be necessary to place the device further away from sources of magnetic fields of power frequency or install magnetic shielding: the magnetic field energy frequency must be measured at the designated installation location, to ensure that it is sufficiently small.
NOTE: UT is the mains alternating voltage before application of the test level.			

Systems of non-life support table 204

Diretivas e declaração do FABRICANTE - RESISTÊNCIA A INTERFERÊNCIAS eletromagnéticas

The device is designed for use in the electromagnetic environment specified below. The customer or user must ensure that the equipment is used in such an environment.

interference resistance tests	**Test level IEC 60601**	**Level ence Correspondent**	**ELECTROMAGNETIC ENVIRONMENT - Policies**
Quantities of AF guided interference IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	communications equipment aF portable and mobile should not be used at a distance from any device, including cables, which is less than the distance recommended protection, calculated from the equation appropriate for transmission frequency. Distance protection recommended: 150 kHz to 80 MHz $d = 1,2\sqrt{P}$ 80 MHz to 800 MHz $d = 1,2\sqrt{P}$ 800 MHz to 2.5 GHz $d = 2,3\sqrt{P}$
AF quantities of radiated interference per IEC 61000-4-3	3 V / m 80 MHz 2.5 GHz	3 V / m	With P as the nominal transmitter power in Watts (W) according to the instructions of the manufacturer ed transmitter as recommended protection distance in meters (m). The intensity of stationary radio **transmitters field is, at all frequencies, as an essay on site The, less than CORRELATION LEVEL B. Nearby devices marked with this** symbol, there is possibility of having interference.

NOTE 1 At 80 MHz and 800 MHz, worth the higher value.

NOTE: 2 These directives can not be applicable in all situations. The spread of electromagnetic waves is affected by absorption and reflection from structures, objects and people.

a) The field strength of fixed transmitters, such as base stations to mobile radio and land mobile radio, amateur radio stations, radio stations, AM and FM and TV stations, in theory can not be predicted accurately. To determine the electromagnetic environment due to fixed HF transmitters, it is recommended an inspection of the locality. If the field intensity measured at the location of the device exceeds the correlation level above, the device should be observed for normal operation, in each injection site. If features are observed to behave abnormally, you may need to take additional measures, such as re-orienting or relocating the device.

b) Over the frequency range 150 kHz to 80 MHz, the field strength should be less than 3 V / m.

protection recommended distances between portable and mobile HF communication devices and the device table 206

protection recommended distances between portable HF communication devices and mobile and device			
The device is designed for use in an electromagnetic environment in which the quantities of radiated interference AF are controlled. The customer or the device user can help prevent electromagnetic interference by maintaining minimum distances between portable HF communication devices and mobile (transmitters) and the device as recommended below, according to maximum output power of the communications equipment .			
nominal power transmitter [W]	**protection distance according to frequency Transmission [m]**		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	**80 MHz to 800 MHz** $d = 1.2\sqrt{P}$	**800 MHz to 2.5 GHz** $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	00:37	00:37	0.74
1	1.17	1.17	2.34
10	3.69	3.69	7.38
100	11.67	11.67	23.33
For transmitters whose rated power is not specified in the above table, the distance can be determined using the equation belonging to the respective column, where P is the nominal transmitter power in watts [W] according to the instructions of the manufacturer transmitter. NOTE 1: At 80 MHz and 800 MHz, the distance protection for the upper frequency band must be applied. NOTE 2: These guidelines may not apply in all situations. The spread of electromagnetic waves is affected by absorption and reflection from structures, objects and people.			

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